ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABUS

Effective from the Academic Year 2017-18 onwards

Department of Electrical & Electronics Engineering (EEE)

For

B. Tech. Four Year Degree Programme

(MR17 Regulations)

MALLA REDDY ENGINEERING COLLEGE (Autonomous)

(An UGC Autonomous Institution, Approved by AICTE and Affiliated to JNTUH Hyderabad, Recognized under section 2(f) &12 (B) of UGC Act 1956, Accredited by NAAC with 'A' Grade (II Cycle) and NBA, Maisammaguda, Dhulapally (Post Via Kompally), Secunderabad-500 100
Website: www.mrec.ac.in E-mail: principal@mrec.ac.in

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

MR17 – ACADEMIC REGULATIONS (CBCS)
for B.Tech. (REGULAR) DEGREE PROGRAMME

Applicable for the students of B.Tech. (Regular) programme admitted from the Academic Year ***2017-18*** onwards

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

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.

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 postgraduateprogrammes 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 (PEOs)

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.

PROGRAMME OUTCOMES (POs)

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1. To offer optimum solution for electrical engineering problems through advanced technologies like embedded system based technology.

PSO2. To develop new technologies to generate electrical energy through renewable sources for better future.

PSO3. To enhance the technical solutions through LabVIEW to comply with industrial requirements.

1. **Under-Graduate Degree Programme in Engineering & Technology (UGP in E&T): Malla Reddy Engineering College (Autonomous)** offers 4 Year (8 Semesters) **Bachelor of Technology** (**B.Tech**.) Under Graduate Programmes, with effect from the Academic Year 2017-18 onwards, in the following Branches of Engineering.

S. No.	Branch Code	Branch	Intake
1	01	Civil Engineering (CE)	180
2	02	Electrical and Electronics Engineering (EEE)	60
3	03	Mechanical Engineering (ME)	240
4	04	Electronics And Communication Engineering (ECE)	180
5	05	Computer Science and Engineering (CSE)	240
6	06	Information Technology (IT)	60
7	25	Mining Engineering (Mi.E)	60

2. Eligibility for Admission

2.1 Admission to the UGP shall be made either on the basis of the merit rank obtained by the qualifying candidate in entrance test conducted by the Telangana State Government (TSEAMCET), or the University, or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government of Telangana from time to time.

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

3. B.Tech. Programme (UGP) Structure & Duration of Study.

3.1 A student after securing admission shall pursue the Under Graduate Programme in B.Tech. in a minimum period of **four** academic years (8 semesters) and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester. Further 2 years of extension is allowed for appearing examinations, failing which student shall forfeit seat in B.Tech. Course.

Each semester is structured to provide 24 credits, totaling to 192 credits for the entire B.Tech. programme.

Each student shall secure 192 credits (with CGPA ≥ 5) required for the completion of the Under Graduate Programme and award of the B.Tech. degree.

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

3.2.1 Semester Scheme:

Each UGP is of 4 academic years (8 Semesters), with the academic year being divided into two semesters of 22 weeks (≥ 90 teaching days, out of which number of contact days for teaching / practical ≥ 75 and conducting examinations and preparation days = 15) each, each semester having **'Continuous Internal Evaluation (CIE)'** and **'Semester End Examination (SEE)'**. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as indicated by UGC and Curriculum / Course Structure as suggested by AICTE are followed.

3.2.2 Credit Courses:

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

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

Courses like Computational Mathematics Lab, Environmental Science, Professional Ethics, Gender Sensitization lab, Law for Engineers, Fine Arts / Foreign languages and other student activities like Internship, Sports / Yoga and NSS are identified as Mandatory / Audit courses. These courses will not carry any credits.

3.2.3 Subject / Course Classification:

All subjects / courses offered for the under graduate programme in E&T (B.Tech. degree programmes) are broadly classified as follows. The Institute has followed almost all the guidelines issued by AICTE / UGC/Affliating University.

(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 grouping for each of the UGP in E & T (B.Tech. Degree Programmes), is as listed below (along with AICTE specified % 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.	5.20 %	5- 10 %
2	BS		Basic Sciences (BS) including Mathematics, Physics and Chemistry.	15.10 %	15- 20%
3	ES		Engineering sciences (ES) including Engineering Workshop, Engineering Graphics, Basics of Electrical and Electronics / Mechanical / Computer Engineering.	23.95 %	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.	29.68 %	30 – 40%
5	PR	Project Related	Minor and major projects, Technical Seminar and Comprehensive viva-voce.	9.89 %	10 – 15%
6	PE	Professional Electives	Professional electives are relevant to the chosen specialization / branch.	10.41 %	10– 15 %
7	OE	Open Electives	Open electives are the courses from other technical and / or emerging subject areas.	5.2 %	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.)					**192 (100%)**

4.0 Course Registration

4.1 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.

4.2 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'.

4.3 A Student can apply for ON-LINE Registration, ONLY AFTER obtaining the 'WRITTEN APPROVAL' from the Faculty Advisor / Counselor, 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 / Counselor and the Student).

4.4 A Student may be permitted to register for the Subjects / Course of CHOICE with a typical deviation of ± 4 credits of the semester with minimum credits of 20 and maximum credits of 28, 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, 'within a period of 15 days' from the beginning of the current semester.

4.5 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.

4.6 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. Such changes are to be intimated to Chief Controller of Examinations/Principal immediately.

4.7 **Open Electives**: A student has to complete 3 Open Electives during the period of UGP. The students have to choose only one open elective in a semester from III year I semester onwards from the given list. However, the student cannot opt for an open elective subject offered by their own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.

4.8 Professional Electives: A student has to complete 6 Professional Electives during the period of UGP. Students have to choose professional electives from III year I semester onwards from the list of professional electives offered by their departments.

4.9 For Audit Courses like Sports / Yoga and NSS, Computational Mathematics Lab, MOOC/NPTEL online courses etc, a '**Satisfactory Participation Certificate**' from the authorities concerned for the relevant semester is essential. No Marks or Credits shall be awarded for these activities.

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

5.0 Subjects / Courses to be offered

5.1 A typical Section (or Class) strength for each semester shall be 60.

5.2 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.

5.3 More than ONE TEACHER may offer the SAME SUBJECT (Lab / Practical may be included with the corresponding theory subject in the same semester) in any semester. However, selection choice for students will be based on 'FIRST COME FIRST SERVE' basis and 'CGPA Criterion' (ie., the first focus shall be on early ON - LINE ENTRY from the student for registration in that semester and the second focus, if needed, will be on CGPA of the student).

5.4 If more entries for registration of a subject come into picture, then the concerned Head of the Department shall take necessary actions, whether to offer such a Subject / Course for TWO (or multiple) SECTIONS or NOT .

6.0 Attendance Requirements:

6.1 A student shall be eligible to appear for the Semester End Examinations, if he / she acquire a minimum of 75 % of attendance in aggregate of all the Subjects / Courses (including Non - Credit Courses) for that semester.

6.2 Condoning of shortage of attendance in aggregate up to 10 % (>= 65 % and < 75 %) in each semester may be granted by the College Academic Committee (CAC) on genuine and **valid grounds** based on the student's representation with supporting evidence.

6.3 A stipulated fee prescribed by the CAC, shall be payable towards condoning of shortage of attendance.

6.4 Shortage of attendance below 65% in aggregate shall in NO case be condoned.

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

6.6 If any student fulfills the attendance requirement in the present semester shall not be eligible for readmission into the same class.

7.0 **Academic Requirements:**

The following Academic Requirements have to be satisfied, in addition to the attendance requirements mentioned in item No.**7.**

7.1 A student shall be deemed to have satisfied the Academic Requirements and earned the credits allotted to each Subject / Course, if he / she 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.

7.2 A student shall be deemed to have satisfied the Academic Requirements and earned the credits allotted to Minor Project / Technical Seminar / Major Project, if he / she secure not less than 40 % of the total marks to be awarded for each. The student would be treated as failed, if he (i) does not submit a report on his / her Minor Project / Technical Seminar / Major Project or does not make a presentation of the same before the Evaluation Committee as per schedule or (ii) secures less than 40 % of marks in industry oriented Mini Project / Technical Seminar / Main Project evaluations.

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

7.3 **Promotion Rules:** Every student has to fulfil the Attendance and Academic requirements by securing the required credits against registered credits as shown below:

Sl. No.	Promotion	Conditions to be fulfilled
1.	First year first semester (I Semester) to first year second semester (II Semester)	• Regular course of study of first year first semester. (I Semester)
2.	First year second semester (II Semester) to second year first semester (III Smester)	• Regular course of study of first year second semester (II Semester). • Must have secured at least 50 % credits up to first year second semester (II Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3.	Second year first semester (III Semester) to second year second semester (IV Semester)	• Regular course of study of second year first semester (III Semester)

4.	Second year second semester (IV Semester) to third year firstsemester (V Semester)	• Regular course of study of second year second semester (IV Semester). • Must have secured at least 60% credits up to second year second semester (IV Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5.	Third year first semester (V Semester) to third year second semester (VI Semester)	• Regular course of study of third year first semester (V Semester).
6.	Third year second semester (VI Semester) to fourth year first semester (VII Semester)	• Regular course of study of third year secondsemester (VI Semester). • Must have secured at least 60 % credits up to third year second semester (VI Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations ornot.
7.	Fourth year first semester (VII Semester) to fourth year second semester (VIII Semester)	• Regular course of study of fourth year first semester (VII Semester).

7.4 A Student shall register for all subjects covering 192 credits as specified and listed (with the relevant Course / Subject Classifications as mentioned) in the Course Structure, fulfills all the Attendance and Academic requirements for 192 credits securing a minimum of 'P' Grade (Pass Grade) or above in each subject and earn all 192 credits securing SGPA $\geq$ 5.0 (in each semester) and CGPA (at the end of each successive semester) $\geq$ 5.0, to successfully complete the UGP.

7.5 After securing the necessary 192 credits as specified for the successful completion of the entire under graduate programme, the student can avail exemption of two subjects up to 6 credits, that is, one open elective and one professional elective subject or two professional elective subjects for optional drop out from these 192 credits earned; resulting in 186 credits for under graduate programme performance evaluation, i.e., the performance of the student in these 186 credits shall alone be taken into account for the calculation of the final CGPA (at the end of under graduate programme, which takes the SGPA of the IV year II semester into account) and shall be indicated in the grade card of IV year II semester. However, the performance of student in the earlier individual semesters, with the corresponding SGPA and CGPA for which grade cards have already been given will not be altered.

7.6 If a student registers for some more **'Extra Subjects'** (in the parent Department or other Departments / Branches of Engineering) other than those listed subjects totaling to 192 credits as specified in the Course Structure of his / her department, the performances in those 'extra Subjects' (although evaluated and graded using the same procedure as that of the required 192 credits) will not be taken into account while calculating the SGPA and CGPA. For such extra subjects registered, 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 No.7 and 8.1 to 8.5.

7.7 When a student is detained due to shortage of attendance in any semester, he / she may be re - admitted when the same semester is offered in the next academic year for fulfillment of academic requirements. The academic regulations under which student has been readmitted shall be

applicable. However, no Grade Allotments or SGPA / CGPA calculations will be done for that entire semester in which he / she got detained.

7.8 When a student is detained due to lack of credits in any year, shall be promoted to the next academic year only after acquiring the required academic credits. The academic regulations under which student has been readmitted shall be applicable to him.

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

8.0 Evaluation, Distribution and Weightage of Marks

The performance of a student in each semester shall be evaluated subject - wise (irrespective of credits assigned) for 100 marks for Theory, Practicals, Seminar, Drawing / Design, Minor Project, Major Project and Minor Courses etc.,. For all Subjects / Courses, the distribution shall be 40 marks for CIE (Continuous Internal Evaluation) and 60 marks for the SEE (Semester End Examination) and a Letter Grade corresponding to the % of marks obtained shall be given.

8.1 Theory Courses:

8.1.1 Continuous Internal Evaluation (CIE):

During the semester, there shall be **2 mid - term examinations** for 40 marks each. Each mid - term examination consists of online **objective test** for 10 marks with duration of **20 minutes** and **subjective paper** for 25 marks with duration of **90 minutes**. Further, there will be an allocation of 5 marks for **Assignment.**

Mid – Term Examination -UG				
Part	**Type of Questions**	**No. of questions**	**Marks per question**	**Total**
Part A	Multiple-choice questions	20	0.5	10
Part B	Compulsory questions	5	2	10
Part C	Choice questions [3 out of 5]	3	5	15
Mid-Term Exam Total				35
Assignment				05
Grand Total				40

The first mid - term examination shall be conducted for the first 50% of the syllabus and the second mid-term examination shall be conducted for the remaining 50% of the syllabus. First assignment should be submitted before the conduct of the first mid - term examinations and the second assignment should be submitted before the conduct of the second mid – term examinations. The assignments shall be as specified by the concerned subject teacher. The first mid - term examination marks, first assignment marks shall make one set of CIE marks and the second mid - term examination marks, second assignment 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 marks secured by the student towards Continuous Internal Evaluation in that theory subjects.

8.1.2 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: For each question there will be an 'either or choice', which means that there will be two questions from each module and the student should answer either of the two questions.	5	10	50
Grand Total				60

8.2 Practical Courses:

8.2.1 Continuous Internal Evaluation (CIE):

There will be CIE for 40 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).

8.2.2 Semester End Examination (SEE):

There will be SEE for 60 marks, shall be awarded with a distribution of 15 marks for design/procedure/schematic diagram of the given experiment, 20 marks for conduction of experiment, 15 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.

8.3 Engineering Drawing:

The distribution of marks is as given below

CIE for Engineering Drawing				
Part	**Type of Questions**	**No. of questions**	**Marks per question**	**Total**
Part A	Day-to-Day Work			20
Mid – Term Examination				
Part B	Choice Questions [4 out of 6]	4	5	20
Total				**40**

SEE for Engineering Drawing			
Type of Questions	**No. of questions**	**Marks per question**	**Total**
Either or Choice from each module	5	12	60

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8.4 Projects:

8.4.1 Mini Project:

There shall be a mini - project, in collaboration with an industry of their specialization. Students will register for this immediately after III year II semester (VI Semester) end examinations and pursue it during summer vacation. CIE of 40 marks are awarded based on the report submitted and presentation before the department committee consists of project coordinator, supervisor of the mini - project and a senior faculty member of the department in IV year I semester (VII Semester). SEE of 60 marks will be evaluated by the committee consists of an external examiner, Head of the Department, supervisor of the mini - project and a project coordinator of the department.

8.4.2 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 100 marks allotted for the major project, 40 marks shall be for **CIE** (Continuous Internal Evaluation) and 60 marks for the **SEE** (Semester End Viva-voce Examination). CIE marks shall be awarded by a Departmental Committee consisting of project coordinator, Supervisor of Major Project and a senior Faculty member, from two reviews (average). Review - I will be conducted within a month from the commencement of class work (problem definition, objective, literature survey and brief discription - each 10 marks) and Review - II will be conducted before second mid examination (progress of work, results, discussion and presentation - each 10 marks). The Major Project Viva-voce (SEE) shall be conducted by a committee comprising of an External Examiner, Head of the Department and Project Supervisor. In SEE of 60 marks, 15 marks for working model / simulation / data collection, 15 marks for report preparation and 30 marks for presentation and viva - voce. The external examiner should be selected by Chief Controller of Examinations from outside the college among the autonomous / reputed institutions from a panel of three examiners submitted by the concerned Head of the Department / Board of Studies (BOS) Chaiman.

8.5 Technical Seminar:

For Technical Seminar presentation, the student shall collect the information on a specialized topic, prepare a Technical Report and submit to the department at the time of seminar presentation. The seminar presentation (along with the technical report) shall be evaluated by a committee consisting of Seminar coordinator and two senior faculty members for 100 marks. There shall be no semester end examination for the seminar.

8.6 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 and will be evaluated by a committee, consisting of the Head of the Department and two senior faculty members. There shall be no external evaluation.

8.7 Non-Credit Courses:

8.7.1 Mandatory Courses:

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.

8.7.2 Audit Courses:

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.

9.0 Grading Procedure

9.1 Marks will be awarded to indicate the performance of each student 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) as specified in Item No. 9 and a corresponding Letter Grade shall be given.

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

% of Marks	Grade Points	Letter Grade
≥ 90	10	O (Out Standing)
≥ 80 to < 90	9	A^+ (Excellent)
≥ 70 to < 80	8	A (Very Good)
≥ 60 to < 70	7	B^+ (Good)
≥ 50 to <60	6	B (Average)
≥ 40 to < 50	5	C (Pass)
< 40	0	F (Fail)
Absent	0	Ab

9.3 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 / her Internal Marks (CIE Marks) in those subject(s) will remain same as those he / she obtained earlier.

9.4 A Letter Grade does not imply any specific % of marks.

9.5 In general, a student shall not be permitted to repeat any Subject / Course (s) only for the sake of 'Grade Improvement' or 'SGPA / CGPA Improvement'. However, he / she has to repeat all the Subjects / Courses pertaining to that semester, when he / she is detained (as listed in Items Nos.7.7 & 7.8).

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

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

9.7 The Student passes the Subject / Course only when he / she gets GP ≥ 5 ('C' Grade or above).

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

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

where 'i' is the subject indicator index (takes into account all subjects in a semester), 'N' is the number of Subjects 'REGISTERED' for the semester (as specifically requiredand listed under the Course Structure of the parent Department) is the number of credits allotted to the i^{th} subject and represents the Grade Points (GP) corresponding to the Letter Grade awarded for that i^{th} subject.

9.9 The Cumulative Grade Point Average (CGPA) is a measure of the over all cumulative performance of a student over all semesters considered for registration. The CGPA is the ratio of the Total Credit Points secured by a student in ALL registered courses in ALL semesters and the total number of credits registered in ALL the semesters. CGPA is rounded off to TWO decimal places. CGPA is thus computed from the II semester onwards, at the end of each semester, as per the formula.

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

(i.e., upto and inclusive of 'S' semesters, $S \geq 2$)

where 'M' is the TOTAL number of subjects (as specifically required and listed under the course structure of the parent department) 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 (takes into account all subjects from '1' to 'S' semesters) is the number of credits allotted to the j^{th} subject, and represents the Grade Points (GP) corresponding to the Letter Grade awarded for that j^{th} subject. After registration and completion of I Year I Semester however, the SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

ILLUSTRATION OF CALCULATION OF SGPA

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	2	B	6	2 x 6 = 12
Course 7	2	A+	9	2 x 9 = 18
Course 8	2	A	8	2 x 8 = 16
	Total Credits 24			Total Credit Points 183

SGPA = 183/24 = 7.62

ILLUSTRATION OF CALCULATION OF CGPA:

Course / Subject	Credits	Letter Grade	Grade Points	Credit Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A+	9	4 x 9 = 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30
Course 5	3	B+	7	3 x 7 = 21
Course 6	2	B	6	2 x 6 = 12
Course 7	2	A+	9	2 x 9 = 18
Course 8	2	A	8	2 x 8 = 16
I Year II Semester				
Course 9	4	B+	7	4 x 7 = 28
Course 10	4	O	10	4 x 10 = 40
Course 11	4	A	8	4 x 8 = 32
Course 12	3	B	6	3 x 6 = 18
Course 13	3	C	5	3 x 5 = 15

Course 14	2	A+	9	2 x 9 = 18
Course 15	2	O	10	2 x 10 = 20
Course 16	2	A	8	2 x 8 = 16
	Total Credits = 48			Total Credit Points = 376

CGPA = 376 / 48 = 7.83

9.10 For merit ranking or comparison purposes or any otherlisting, ONLY the 'ROUNDED OFF' values of the CGPAs will be used.

9.11 For calculations listed in Item Nos.9.6 to9.10, performance infailed Subjects / Courses (securing 'F' Grade) will also be taken into account and the credits of such Subjects / Courses will also be included in the multiplications and summations. However, Mandatory Courses will not be taken into consideration.

9.12 Passing Standards:

9.12.1 A student shall be declared successful or 'passed' in a semester, only when he / she gets a SGPA $\geq$ 5.00 (at the end of that particular semester); and a student shall be declared successful or 'passed' in the entire UGP, only when he / she gets a CGPA $\geq$ 5.00; subject to the condition that he / she secures a GP $\geq$ 5 ('C' Grade or above) in every registered Subject / Course in each semester (during the entire UGP) for the degree award, as required.

9.12.2 Inspite of securing 'P' Grade or above in some (or all) Subjects / Courses in any semester, if a student receives a SGPA < 5.00 and / or CGPA < 5.00 at the end of such a semester, then he / she 'may be allowed' (on the 'specific recommendations' of the Head of the Department and subsequent approval from the Principal) (i) to go into the next subsequent semester (subject to fulfilling all other attendance and academic requirements as listed under Items Nos. 7 & 8); (ii) to 'improve his / her SGPA of such a semester (and hence CGPA) to 5.00 or above', by reappearing for ONE or MORE (as per student's choice) of the same course(s) in which he / she has secured 'P' Grade(s) in that semester, at the Supplementary Examinations to be held in the next subsequent semester(s). In such cases, his / her Internal Marks (CIE Marks) in those subject(s) will remain same as those he / she obtained earlier. In these considerations, the newly secured Letter Grades will be recorded and taken into account for calculation of SGPA and CGPA, only if there is an improvement.

9.12.3 A student shall be declared successful in any Non-Credit Course, if he / she secures a 'Satisfactory Participation Certificate' for that Audit Course and "Satisfactory Certificate' for Mandatory Course.

9.13 After the completion of each semester, a Grade Card or Grade Sheet (or Transcript) shall be issued to all the registered students of that semester, indicating the Letter Grades and credits earned. It will show the details of the courses registered (Course Code, Title, No. of Credits and Grade Earned etc.), Credits earned, SGPA and CGPA.

10.0 Declaration of Results

10.1 Computation of SGPA and CGPA are done using the procedure listed in items 9.6 to 9.10.

10.2 For final % of marks equivalent to the computed final CGPA, the following formula may be used …

% of Marks = (final CGPA – 0.5) x 10

11.0 Award of Degree

11.1 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 192 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.

11.2 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

11.3 A student with final CGPA (at the end of the UGP) < 5.00 will not be eligible for the award of the degree.

12.0 With holding of Results

If the student has not paid fees to college at any stage or has pending dues against his / her name due to any reason whatsoever or if any case of indiscipline is pending against him, the result of the student may be with held and he / she will not be allowed to go into the next higher semester. The award or issue of the degree may also be with held in such cases.

13.0 Transitory Regulations

A. **For students detained due to shortage of attendance**:

1. A student who has been detained in I year of MR13 / MR14 / MR15 regulations due to lack of attendance, shall be permitted to join I year I Semester of MR17 regulations and he / she is required to complete the study of B.Tech.programme within the stipulated period of eight academic years from the date of first admission in I Year.
2. A student who has been detained in any semester of II, III and IV years of MR13 / MR14 / MR15 regulations for want of attendance shall be permitted to join the corresponding semester of MR17 regulations and is required to complete the study of B.Tech. with in the stipulated period of eight academic years from the date of first admission in I Year. The MR17 academic regulations under which a student has been readmitted shall be applicable to that student from that semester. See rule (C) for further transitory regulations.

B. **For students detained due to shortage of credits**:

3 A student of MR13 / MR14 / MR15 regulations, who has been detained due to lack of credits, shall be promoted to the next semester of MR17 regulations only after acquiring the required credits as per the corresponding regulations of his / her first admission. The student is required to complete the study of B.Tech. with in the stipulated period of eight academic years from the year of first admission. The MR17 academic regulations are applicable to a student from the year of readmission onwards. See rule (C) for further Transitory Regulations.

C. **For readmitted students in MR17 regulations**:

4 A student who has failed in any subject under any regulation has to pass those subjects in the same regulations.

5 The maximum credits that a student acquires for the award of degree, shall be the sum of the total number of credits secured in all the regulations of his / her study including MR17 regulations. The performance evaluation of the student will be done after the exemption of two subjects if total credits acquired are ≤ 206, three subjects if total credits acquired are > 206 (see MR17 regulations for exemption details).

6 If a student readmitted to MR17 regulations, has any subject with 80 % of syllabus common with his / her previous regulations, that particular subject in MR17 regulations will be substituted by another subject to be suggested by the College Academic Committee (CAC).

Note: If a student readmitted to MR17 regulations, has not studied any subjects / topics in his / her earlier regulations of study which is prerequisite for further subjects in MR17 regulations, the departments concerned shall conduct remedial classes to cover those subjects/topics for the benefit of the students.

14.0 Student Transfers

14.1 There shall be no branch transfers after the completion of admission process.

14.2 The students seeking transfer to MALLA REDDY ENGINEERING COLLEGE (Autonomous) - MREC(A) from various other Universities / Institutions have to pass the failed subjects which are equivalent to the subjects of MREC(A) and also pass the subjects of MREC(A) which the students have not studied at the earlier institution. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of MREC(A), the students have to study those subjects in MREC(A) inspite of the fact that those subjects are repeated.

14.3 The transfer students from other Universities / Institutions to MREC(A) who are on rolls will be provided one chance to write internal examinations in the failed subjects and / or subjects not studied as per the clearance letter issued by the JNTUH.

15.0 Scope

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

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

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

(iv) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the College Academic Committee headed by the Principal is final.

Academic Regulations for B.Tech. (Lateral Entry Scheme) w.e.f the A Y 2018-19

1. **Eligibility for award of B. Tech. Degree (LES)**

   The LES students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years.

2. The student shall register for 144 credits and secure 144 credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree. **Out of the 144 credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects resulting in 138 credits for B.Tech. programme performance evaluation**.**

3. The students, who fail to fulfil the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech.(LES).

5. **Promotion Rule:**

Sl.No.	Promotion	Conditions to be fulfilled
1	Second year first semester (III Semester) to second year second semester (IV Semester)	Regular course of study of second year first semester (III Semester).
2	Second year second semester (IV Semester) to third year first semester (V Semester).	**(i)** Regular course of study of second year second semester (IV Semester) **(ii)** Must have secured at least 29 credits out of 48 credits i.e., 60 % credits up to second year second semester (IV Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Third year first semester (V Semester) to third year second semester (VI Semester)	Regular course of study of third year first semester (V Semester).
4	Third year second semester (VI Semester) to fourth year first semester (VII Semester)	**(i)** Regular course of study of third year second semester (VI Semester) **(ii)** Must have secured at least 58 credits out of 96 credits i.e., 60 % credits up to third year second semester (VI Semester) from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester (VII Semester) to fourth year second semester (VIII Semester)	Regular course of study of fourth year first semester (VII Semester)

6. All the other regulations as applicable to B. Tech. 4 - year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme).

MALPRACTICES RULES

DISCIPLINARY ACTION FOR IMPROPER CONDUCT IN EXAMINATIONS

Sl.No.	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 student 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 course of the examination)	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 student 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 students 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 student 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 student who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original student 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 student 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 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	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 candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the courses of that semester. The students 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.

	means or misconduct or has the tendency to disrupt the orderly conduct of the examination	
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 student 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 student 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 student 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 studentfor 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 student 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.***

Malpractices identified by squad or special invigilators

1. Punishments to the students as per the above guidelines.

MALLA REDDY ENGINEERING COLLEGE (Autonomous)

COURSE STRUCTURE – B.Tech. ELECTRICAL AND ELECTRONICS ENGINEERING

(Choice Based Credit System)

(MR17 Regulations - Effective from Academic Year 2017-18 onwards)

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	70H01	English	3	-	-	3	40	60	100
2	BS	70B01	Engineering Mathematics	3	2	-	4	40	60	100
3	BS	70B06	Engineering Physics	4	-	-	4	40	60	100
4	ES	70501	Computer Programming	2	2	-	3	40	60	100
5	ES	70301	Engineering Graphics	4	-	-	4	40	60	100
6	HS	70H02	English Language Lab	-	-	4	2	40	60	100
7	BS	70B07	Engineering Physics Lab	-	-	4	2	40	60	100
8	ES	70502	Computer Programming Lab	-	-	4	2	40	60	100
9	AC	70A01	NSS and Sports / Yoga	-	-	2	-	-	-	-
Total				16	4	14	24	**Contact Periods: 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	BS	70B02	Computational Mathematics	3	2	-	4	40	60	100
2	BS	70B08	Applied Physics	3	-	-	3	40	60	100
3	BS	70B10	Applied Chemistry	4	-	-	4	40	60	100
4	ES	70201	Basic Electrical and Electronics Engineering	3	-	-	3	40	60	100
5	ES	70503	Data Structures	4	-	-	4	40	60	100
6	BS	70B11	Applied Chemistry Lab	-	-	4	2	40	60	100
7	ES	70504	Data Structures Lab	-	-	4	2	40	60	100
8	ES	70303	Engineering Workshop	-	-	4	2	40	60	100
9	MC	70M01	Computational Mathematics Lab	-	-	3	-	40	60	100
Total				17	2	15	24	**Contact Periods: 34**		

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	70B03	Advanced Calculus	2	2	-	3	40	60	100
2	PC	70202	Electrical Circuit Analysis and Synthesis	4	-	-	4	40	60	100
3	ES	70401	Electronic Circuits -I	3	-	-	3	40	60	100
4	ES	70305	Fluid Mechanics and Hydraulic Machines	3	-	-	3	40	60	100
5	ES	70402	Switching Theory & Logic Design	3	-	-	3	40	60	100
6	PC	70203	Electromagnetic Fields	4	-	-	4	40	60	100
7	ES	70311	Fluid Mechanics and Hydraulic Machines Lab	-	-	4	2	40	60	100
8	PC	70204	Electrical Circuits Lab	-	-	4	2	40	60	100
9	MC	70M02	Gender Sensitization	-	-	3	-	40	60	100
10	AC	70A02	Law for Engineers	-	2	-	-	-	-	-
11	AC	70A03	Internship - I	-	-	-	-	-	-	-
Total				19	4	11	24	**Contact Periods:34**		

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	70B05	Special Functions and Complex Variable	2	2	-	3	40	60	100
2	PC	70205	DC Machines and Transformers	3	-	-	3	40	60	100
3	PC	70206	Power Generation and Distribution	3	-	-	3	40	60	100
4	PC	70207	Electrical Measurements and Instrumentation	2	2	-	3	40	60	100
5	PC	70208	Power Transmission Systems	2	2	-	3	40	60	100
6	ES	70408	Pulse & Digital Circuits	3	-	-	3	40	60	100
7	ES	70405	Electronic Circuits - I Lab	-	-	4	2	40	60	100
8	PC	70209	DC Machines Lab	-	-	4	2	40	60	100
9	PC	70210	Electrical Measurements Lab	-	-	4	2	40	60	100
10	MC	70M03	Environmental Science	-	2	-	-	40	60	100
Total				15	8	12	24	**Contact Periods: 35**		

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	PC	70211	Control Systems	2	2	-	3	40	60	100
2	PC	70212	Power System Analysis	3	-	-	3	40	60	100
3	PC	70213	AC Machines	3	-	-	3	40	60	100
4	PC	70214	Power Electronics	3	-	-	3	40	60	100
5	ES	70414	Linear & Digital Integrated Circuit Applications	3	-	-	3	40	60	100
6	Professional Elective - I									
	PE	70421	Digital Signal Processing	2	2	-	3	40	60	100
		70223	Programmable logic controllers and their applications							
		70547	Computer Organization and Operating Systems							
7	PC	70215	AC Machines Lab	-	-	4	2	40	60	100
8	ES	70413	Pulse & Digital Circuits Lab	-	-	4	2	40	60	100
9	PC	70216	Control Systems Lab	-	-	4	2	40	60	100
10	MC	70M04	Professional Ethics	-	2	-	-	40	60	100
11	AC	70A05	Internship - II	-	-	-	-	-	-	-
Total				16	6	12	24	**Contact Periods:34**		

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	70H04	Engineering Economics and Accountancy	2	-	-	2	40	60	100
2	ES	70448	Microprocessors and Microcontrollers	2	2	-	3	40	60	100
3	PC	70217	Switchgear and Protection	2	2	-	3	40	60	100
4	PC	70218	Power System Operation and Control	2	2	-	3	40	60	100
5	Professional Elective – II									
	PE	70224	Advanced Control Systems	3	2	-	4	40	60	100
		70225	Special Machines							
		70226	Electrical Distribution Systems and Automation							
6	OE		Open Elective - I	3	2	-	4	40	60	100
7	HS	70H03	English Communication and Presentation Skills Lab	-	-	2	1	40	60	100
8	PC	70219	Power Electronics Lab	-	-	4	2	40	60	100
9	PR	70P01	Technical Seminar	-	-	4	2	100	-	100
10	AC	70A04	MOOCs/ NPTEL Certification Course	-	2	-	-	-	-	-
Total				14	12	10	24	**Contact Periods:36**		

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	70H05	Management Fundamentals	2	-	-	2	40	60	100
2	PC	70220	Solid State Drives	3	-	-	3	40	60	100
3	PC	70221	Utilization of Electrical Energy	2	2	-	3	40	60	100
4	Professional Elective - III									
	PE	70426	VLSI Design	3	-	-	3	40	60	100
		70505	Object Oriented Programming through JAVA							
		70227	Energy Audit and Conservation							
5	Professional Elective - IV									
	PE	70228	Supervisory Control And Data Acquisition	3	2	-	4	40	60	100
		70229	Electrical Power Quality							
		70230	HVDC and FACTS							
6	OE		Open Elective - II	3	-	-	3	40	60	100
7	PC	70222	Solid State Drives Lab	-	-	4	2	40	60	100
8	ES	70449	Microprocessors and Microcontrollers Lab	-	-	4	2	40	60	100
9	PR	70P02	Mini Project	-	-	4	2	100	-	100
Total				16	4	12	24	**Contact Periods:32**		

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	Professional Elective - V									
	PE	70231	EHV AC Transmission	3	-	-	3	40	60	100
		70232	Electric Smart Grid							
		70233	Advanced Power Electronics							
2	Professional Elective - VI									
	PE	70234	High Voltage Engineering	3	-	-	3	40	60	100
		70235	Neural Networks and Fuzzy Logic							
		70236	Electrical Estimation and Costing							
3	OE		Open Elective - III	3	-	-	3	40	60	100
4	PR	70P03	Entrepreneurship	-	2	-	1	40	60	100
5	PR	70P04	Comprehensive Viva Voce	-	-	4	2	100	-	100
6	PR	70P05	Major Project	-	-	18	12	40	60	100
7	AC	70A06	Fine Arts / Foreign Language	-	2	-	-	-	-	-
Total				9	4	22	24	**Contact Periods:35**		

LIST OF OPEN ELECTIVES

Sl. No.	Branch	Course Code	Name of the Course	No. of Credits
1.	CIVIL	70132	Air Pollution and Control	4
2.	EEE	70241	Electrical Safety and Energy Management	4
3.	MECH	70355	Industrial Safety	4
4.	ECE	70446	Principles of Communication Engineering	4
5.	CSE	70537	Software Quality Assurance and Testing	4
6.	IT	70619	Information Retrieval Systems	4
7.	MINING	72501	Introduction to Mining Engineering	4
8.	MBA	7B159	Training and Organizational Development	4
9.	ENGLISH	70H07	English Language Skills	4
10.	MATHEMATICS	70B15	Transform Techniques	4
11.	PHYSICS	70B17	Advanced Physics for Engineers	4
12.	CHEMISTRY	70B20	Chemistry of Engineering Materials	4
13.	CIVIL	70103	Surveying	3
14.		70150	Green Buildings	3
15.	EEE	70227	Energy Audit and Conservation	3
16.		70240	Energy Storage Systems	3
17.	MECH	70347	Renewable Energy Sources	3
18.		70351	Total Quality Management	3
19.	ECE	70430	Digital Design Using Verilog HDL	3
20.		70438	Satellite Communications	3
21.	CSE	70539	Android Application Development	3
22.		70544	Software Project Management	3
23.	IT	70605	Advanced Java Programming	3
24.		70621	Management Information System	3
25.	MINING	72504	Drilling and Blasting	3
26.		72543	Tunnelling Engineering	3
27.	MBA	7B108	Creativity and Innovations Management	3
28.		7B136	Digital Marketing	3
29.	ENGLISH	70H08	Interpretation Skills and Analytical Writing	3
30.		70H09	World Literature	3
31.	MATHEMATICS	70B14	Applied Statistics	3
32.		70B16	Optimization Techniques	3
33.	PHYSICS	70B18	Nano Materials	3
34.		70B19	NDT and Vacuum Technology	3
35.	CHEMISTRY	70B21	Nano Chemistry	3
36.		70B22	Photochemistry and Spectroscopy	3

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code:70H01	**ENGLISH**	**L**	**T**	**P**
Credits: 3	(Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	**3**	**-**	**-**

Prerequisite: Nil

Course Objective:

The objective of this course is to improve the English Language competency of the students, which emphasizes on all language components namely grammar, vocabulary, prose, short stories. Further, it also helps in developing the skills of Reading and Writing. As a result students are equipped to study the academic subjects more effectively using the theoretical and practical components of the English syllabus.

MODULE I: Minimalism- Live a Meaningful Life **10 Periods**

Poem : **Road Not Taken** by **Robert Frost**
Vocabulary : Formation of words, prefixes, suffixes and root words
Grammar : Articles and Prepositions
Reading : Skimming and Scanning
Writing : Introduction to writing skills, characteristics of effective writing

MODULE II: Knowledge Society **10 Periods**

Poem : **Life** by Sarojini Naidu
Vocabulary : Homonyms, homophones, homographs
Grammar : Sentence Structures, Voice – exercises
Reading : Intensive Reading and Extensive Reading
Writing : Paragraph writing- use of cohesive devices; arranging jumbled sentences into Paragraph

MODULE III: Half a Rupee Worth **10 Periods**

Poem : **If** by **Rudyard Kipling**
Grammar : Tense, aspect and concord
Vocabulary : Idiomatic Expressions; Phrasal Verbs
Reading : Reading for theme and gist.
Writing : Essay Writing

MODULE IV: Jesse Owens **9 Periods**

Poem : **I too Sing America** by **Langston Hughes**
Grammar : Question Tags; Degrees of Comparison
Vocabulary : One word substitutions; synonyms and antonyms
Reading : Reading for interpretation
Writing : Letter writing- both formal and informal

MODULE V: Pecuniary Independence **9 Periods**

Poem : **Human Family** by **Maya Angelou**
Grammar : Direct and Indirect Speech
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.

TEXT BOOKS

1. T.V.Surnedranath Reddy, B.Vijay Kumar and K.James. *"***Effective English"**, First Edition, Maruthi Publications, 2017.

REFERENCES

1. Azar, Betty and Stacy A, Hagen**,** Understanding and Using English Grammar, Foundation Books, 4th Edition, 2009.
2. Chaudhuri, SantanuSinha, Learn English: A Fun Book of Functional Language**,** Grammar and Vocabulary, New Delhi: Tata McGraw Hill Education, 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, A Communicative Grammar of English, London: Longman, 3rd Edition, 2002.

E - RESOURCES

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.

Course Outcomes

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

1. Use English considerably well in written and spoken.
2. Enrich language accurately and fluently.
3. Employ extensive and intensive reading skills
4. Gain confidence in using English language and skills for writing in real life situations.
5. Use standard grammar, punctuation, and spelling in documents.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: 70B01	ENGINEERING MATHEMATICS (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: 4		3	2	-

Prerequisite: Nil

Course Objectives:

The objective of this course is to familiarize the students with linear algebra and elements of mathematics. Differential equations play a major role in understanding many processes and systems that are of interest to the engineers in a generic sense. An in-depth understanding of the ordinary and higher order differential equation are an absolutely essential part of the tool-kit of a well trained engineer. This course fills into this perceived need. The treatment should be informed by the fact that not only conceptual but also and in some cases, more importantly numerical or computational methods are of essence. This is specially designed for students to help them bring to speed with other students who have already had some training in mathematics at the 12^{th} standard level.

MODULE I: Matrices and Linear Systems of Equations 12 Periods

Rank of the matrix - Elementary transformations –Echelon form – Normal form – PAQ Form - Inverse of a Matrix by applying Elementary transformations.

Solution of Linear Systems – Consistency of linear system of equations – Gauss elimination method – LU-Decomposition method –Solution of Tri-diagonal Systems (Thomas Algorithm).

MODULE II: Eigen Values & Eigen Vectors 13 Periods

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.

Diagonolization of matrix-Calculation of powers of matrix,– Modal and spectral matrices. Real matrices – Symmetric - skew – symmetric -Orthogonal Matrix. Similarity Transformation - Orthogonal Transformation. Quadratic forms

MODULE III: Differential Equations of First Order and First Degree 13 Periods

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

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 13 Periods

Rules for finding Complementary function-Particular integral (Non-homogeneous term of the type e^{ax} , $Sin\, bx$ / $Cos\, bx$, x^n, $e^{ax}V(x)$, $x^nV(x)only$)

Method of variation of parameters. Equations reducible to constant coefficients - Cauchy - Euler and Legendre's differential equations.

MODULE V: Laplace Transforms 13 Periods

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' , Evaluation of Integrals by using Laplace transforms.

Inverse Laplace transforms: Finding inverse Laplace transforms 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. Kreyszig, **"Advanced Engineering Mathematics"**, John Wiley & Sons Publishers, 10th Edition, Reprint 2010.
2. B.S. Grewal, Khanna, **"Higher Engineering Mathematics",** Publishers, 43rd Edition, Reprint 2011.

REFERENCES

1. Richard Bellman,**"Introduction to Matrix Analysis"**, Dover Publications, 2nd Edition, 1970.
2. R.K. Jain & S.R.K. Iyengar, **"Advanced Engineering Mathematics"** 3rd edition, Narosa Pub. House, Delhi.
3. Kanti B.Datta, **"Mathematical Methods of Science and Engineering"**, Cengage Learning.
4. Alan Jeffrey, **"Mathematics for Engineers and Scientists"**, 6ht Edi, 2013, Chapman & Hall/ CRC.

E -RESOURCES

1. http://home.scarlet.be/math/stelsels.htm (Systems of linear equations, matrices)
2. https://www.math.ust.hk/~machas/differential-equations.pdf (Differential equations)
3. http://www.math.psu.edu/shen_w/250/NotesLaplace.pdf (Laplace transform)
4. https://globaljournals.org/GJCST_Volume15/4-System-of-Linear-Equations.pdf(Matrices)
5. http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=6541959 (Differential Equations of first order and first degree)
6. https://www.ijsr.net/archive/v2i1/IJSRON2013331.pdf (Laplace transforms
7. http://nptel.ac.in/courses/122107036/32 (Matrices by Prof Sunita Gakkhar)
8. http://nptel.ac.in/courses/122107037/20 (Differential Equations of first order and first degree)
9. http://nptel.ac.in/courses/122107037/14 (Differential Equations of Second & Higher Order)
10. https://www.youtube.com/watch?v=DPg5T-YBQjU (Laplace transforms)

Course Outcomes

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

1. Apply the operations on Matrices like Row, Column operations, Rank of the Matrix and Able to check the Consistency and Inconsistency of the system of equations.
2. Find the Eigen values and Eigen vectors of the given Matrix to analyze the associated Spectral matrix. Application of Cayley –Hamilton theorem.
3. Solve the first order first degree Differential equations and its applications
4. Understand higher order ordinary differential equations and apply them in Bending of Beams and circuit problems.
5. Understand Laplace Transforms and perform its applications to linear differential equations and real time applications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: 70B06	ENGINEERING PHYSICS (Common for CE,EEE,ME,ECE,CSE,IT and Min.E)	L	T	P
Credits: 4		4	-	-

Prerequisites: Nil

Course Objective:

The main objective of this course is to provide an adequate exposure and develop insight about the basic principles of physics along with the possible applications.

MODULE I: Optics **12 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 – resolving power.

MODULE II: Waves and Oscillations **13 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; Qualitative treatment of Forced vibrations, sharpness of resonance, analogy between mechanical and electrical oscillators.

MODULE III: Crystal Structures and X-ray Diffraction **13 Periods**

A: Crystal Structures: Space lattice**,** crystallographic axes, Unit cell, Lattice parameters; Crystal systems, Bravais lattices, Miller indices, Crystal planes and directions, Inter-planar spacing of orthogonal crystal systems, Atomic radius, Coordination number and atomic packing fraction of SC, BCC and FCC lattices, Diamond, ZnS and NaCl structures.

B: X-ray Diffraction: Introduction, Bragg's law, Laue and Powder methods, Application of XRD to analyze Cubic structure.

MODULE IV: Principles of Quantum Mechanics **13 Periods**

Postulates of Quantum mechanics, Louis de Broglie's concept of matter waves, Davisson and Germer's experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time dependent and Independent Wave Equation; Physical Significance and properties of the Wave Function; Energy of a particle in One Dimensional infinite Potential well.

MODULE V: Nano Materials **13 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); Carbonznano-tubes - properties and applications**,** Applications of nano materials - automobiles, electronics, medical, cosmetics, textile.

TEXT BOOKS

1. K Vijaya Kumar, S Chandralingam, "**Modern Engineering Physics**'' Volume I & II, S. Chand, 1st Edition, 2017.
2. M N Avadhanulu, P G Kshirsagar, " **A Textbook of Engineering Physics"**, Revised Edition 2014

REFERENCES

1. P K Palanisamy, **"Engineering Physics"**, SciTech Publication, 4th Edition, 2014.
2. B K Pandey and S. Chaturvedi, "**Engineering Physics**" Cengage Learning India, Revised Edition, 2014.
3. R K Gaur and SL Gupta, "**Engineering Physics**" Dhanpat Rai Publications, Eighth Revised Edition, 2006.
4. D K Bhattacharya, Poonam Tandon, "**Engineering Physics**", Oxford University Press, 1st Edition, 2015.

E - RESOURCES

1. https://www.researchgate.net/publication/259574083_Lecture_Notes_on_Engineering_Physics
2. https://www.researchgate.net/publication/292607115_Applied_Physics
3. http://www.springer.com/physics/theoretical%2C+mathematical+%26+computational+physics/journal/40094
4. http://www.springer.com/physics/journal/340
5. https://www.youtube.com/watch?v=jnjjWI1s9_s&list=PLzJaFd3A7DZse2tQ2qUFChSiCj7jBidO0
6. https://www.youtube.com/watch?v=4a0FbQdH3dY

Course Outcomes

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

1. Be aware of the concepts of Interference, diffraction and its applications.
2. Distinguish free, damped and forced vibrations, develop basic knowledge on the distribution functions and simple applications
3. Apply the basic principles of crystals and analysis of crystal structures using X-ray diffraction.
4. Acquire the theoretical information about matter in terms of quantum physics
5. Analyze and apply various synthesis methods of nano materials and different applications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: 70501	COMPUTER PROGRAMMING (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: 3		2	2	-

Prerequisites: Nil

Course Objectives:
This course provides the fundamental concepts of computers and introduce to the students to the field of programming using C language, apply the control structures, iterations statements, arrays, functions, strings, pointers, structures, unions and files. This course also explains the concepts of searching and sorting techniques in C language.

MODULE I: Fundamentals and Introduction to 'C' Language 11 Periods
Fundamentals: Hardware, Software, Programming languages, Number Systems, Translators, Introduction to Operating System, Program Development steps - Algorithm, Flow charts.
Introduction to 'C' Language: History, Simple C Program, Identifiers, Preprocessor Directives- Include and define, 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 9 Periods
Control Statements: Conditional statements- if and switch statements, ternary operator ?:, Loop Control Statements – while, for, do-while, break, continue and goto statements.
Arrays: Basic concepts, One-dimensional arrays, Two–dimensional arrays, Multi-dimensional arrays.

MODULE III: Strings & Pointers 9 Periods
A: Basic concepts, String Input / Output functions, Arrays of strings, String handling functions.
B: Basic concepts, Pointer arithmetic, Pointers and strings, Pointers and arrays, Dynamic Memory Allocation**.**
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MODULE IV: Functions & Derived Types 9 Periods
Functions: Basics, User defined functions, Inter function communication, Library functions, Storage Classes-auto, register, static, extern, Scope rules, Array and string manipulations using functions, Recursive functions, Pointers and functions.
Derived types: Structures – Basic concepts, Nested structures, Arrays of structures, Structure manipulations using functions, Pointers to structures, Self-referential structures, Unions, bit fields

MODULE V: File I/O, Sorting and Searching 10 Periods
File I/O: Basic concepts, Text files and Binary files, File input / output operations, File status functions (error handling), Command-Line Arguments, C programming examples.
Sorting and Searching: Sorting - selection sort, bubble sort, insertion sort, searching - linear and binary searching methods**.**

TEXT BOOKS
1. PradipDey, Manas Ghosh, **"Programmingin C**", Oxford University Press, 2nd Edition, 2011.
2. E. Balagurusamy, "**Computer Programming in C"**, Tata McGraw Hill, 1st Edition, 2013.

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. Behrouz A. Forouzan, E.V.Prasad, Richard F. Gilberg, "**C programming: A Problem- Solving Approach**", Cengage Learning Press, 1st Edition, 2011.

E -RESOURCES

1. http://oxford university press.ac.in/eBooks/ Programming in C.
2. https://www.journals.elsevier.com/science-of-computer-programming
3. http://www.ejournalofsciences.org
4. http://onlinecourses.nptel.ac.in/iiitk_cs-101
5. http://onlinevideolecture.com/ebooks/?subject=C-Programming

Course Outcomes

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

1. Understand the basic terminology, write, compile and debug programs in computer programming.
2. Apply different types of control structures and arrays in a computer programming.
3. Develop programs that make use of concepts such as strings and pointers in C language.
4. Compare parameter passing techniques, structures and unions in computer programming.
5. Analyze file operations, searching and sorting methods.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: 70301	**ENGINEERING GRAPHICS** (Common to CE, EEE, ECE, CSE, ME, IT and Min.E)	**L**	**T**	**P**
Credits: 4		**4**	**-**	**-**

Prerequisites: Nil

Course Objectives:

The students will be able to understand the manual drawings and getting fundamental knowledge on drafting software.

MODULE I: Introduction to Engineering Drawing 15 Periods

Principles of Engineering Graphics and their Significance. Lettering and dimensioning.
Geometrical Constructions: Regular polygons only. Curves: Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid, Hypocycloid and Involute.
Scales: Construction of different types of scales - Plain, Diagonal and Vernier scale.

MODULE II: Projection of Points, Lines and Planes 15 Periods

Principles of Orthographic Projections – Conventions – First Angle projections. Points & Lines: Projection of Points, Projection of Lines- inclined to both the planes. Planes: Projection of Planes – inclined to one plane only.

MODULE III: Projection of Solids & Section of Solids 15 Periods

A: Projection of Solids: Projections of regular solids like cube, prism, pyramid, tetrahedron, cylinder and cone by rotating object method. Axis inclined to both the reference planes.
B: Section of Solids: Sectioning of above solids in simple vertical position with the cutting plane is inclined to the one plane and perpendicular to the other –true shape of section.

MODULE IV: Development of Surfaces & Isometric Projections 15 Periods

Development of Surfaces: Development of lateral surfaces of simple and sectioned solids – prisms, pyramids cylinders and cones. Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions –Plane Figures, Simple and Compound Solids.

MODULE V: Transformation of Projections & Introduction Auto CAD 15 Periods

Transformation of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects. Introduction to Auto CAD: Introduction, Salient features of AutoCAD software, Basic commands, construction, editing and dimensioning, two dimensional drawings.

TEXT BOOKS

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

REFERENCES

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. K. V. Natarajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2015.
4. M.S. Kumar, "Engineering Graphics", D.D. Publications, 2011.
5. Trymbaka Murthy, "Computer Aided Engineering Drawing", I.K. international Publishing House, 3rd Edition, 2011.

E - RESOURCES

1. https://www.slideshare.net/search/slideshow?searchfrom=header&q=engineering+drawing
2. https://www.wiziq.com/tutorials/engineering-drawing
3. http://freevideolectures.com/Course/3420/Engineering-Drawing
4. http://www.worldcat.org/title/journal-of-engineering-graphics/oclc/1781711
5. http://road.issn.org/issn/2344-4681-journal-of-industrial-design-and-engineering-graphics
6. http://nptel.ac.in/courses/112103019/

Course Outcomes

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

1. Understand the basics of drawings and importance of curves.
2. Draw the projection of points, lines and planes.
3. Draw the projection of solids and section of solids
4. Produce development of surface and isometric projections.
5. Convert orthographic views to isometric views and vice-versa and know the basics of Auto CAD.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: 70H02	ENGLISH LANGUAGE LAB	L	T	P
Credits: 2	(Common for CE,EEE,ME,ECE,CSE,IT and Min.E)	-	-	4

Prerequisites: Nil

Course Objectives:

To sensitize the students to the intelligibility in their pronunciation of English, speech sounds, word accent, intonation and rhythm. It also helps to improve the fluency in spoken English and make them aware of nuances of major skills, *viz* listening and speaking skills. Hence it helps to train the students to understand nuances of both verbal and non verbal communication during all activities. The purpose of this course is to develop confidence levels of the students and to face the audience and participate in public speaking.

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 recognize them, awareness regarding stress and recognize and use the right intonation in sentences.

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

Speaking Skills:

Objectives:

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

REFERENCES

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 Skillsfor Adult Professionals
3. Hamcock, English pronunciation in use (Intermediate),Cambridge university Press,2009
4. Karia, Akash: Public Speaking Mastery, Speak Like a Winner, Kindle Edition, 2013.
5. Lucas, Stephen: The Art of Public Speaking**"** : Tata McGraw Hill, 11th Edition, 2011.

E - RESOURCES

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

Course Outcomes

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

1. Understand the nuances of language through audio- visual experience and group activities
2. Neutralize the accent for intelligibility
3. Realize the importance of listening skills and speaking skills and their application in real life situations.
4. Recognize significance of non-verbal communication and develop confidence to face audience and shed inhibitions.
5. Speak with clarity and confidence thereby enhances employability skills of the students.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: 70B07	**ENGINEERING PHYSICS LAB** (Common to CE, EEE, ME, ECE, CSE, IT and Min.E)	**L**	**T**	**P**
Credits: 2		-	-	4

Course Objective:

The main objective of this course is to provide the necessary exposure to the practical aspects, which is an essential component for learning science.

List of Experiments: (Any ten experiments**)**

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

Course Outcomes

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

1. Develop skills to impart practical knowledge in real time solution.
2. Understand principle, concept, working, application and comparison of results with theoretical calculations.
3. Design new instruments with practical knowledge.
4. Understand measurement technology, usage of new instruments and real time applications in engineering studies.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: 70502	COMPUTER PROGRAMMING LAB (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: 2		-	-	4

Software Requirements: Turbo 'C'

List of Programs:

1. a) Practice various Internal and External DOS Commands.
   b) Implement various programs logics using algorithms and flowcharts.
   c) Write sample examples of C programs to implement basic operations.
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.
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.
4. a) Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.
   b) Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.
5. 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.
6. 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
7. 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.
8. a) Write a C program to implement functions arguments with different returns values.
   b) Write a C program to implement call by value and call by reference using functions.
9. a) Write a C program to find grades of a student's using structures and unions.
   b) Write a C program to implement nested structures.
10. a) Write a C program which copies one file to another.
    b) Write a C program to command line arguments.
11. a) Write a C program that uses non-recursive function to search for a Key value in a given list of integers using Linear search.
    b) Write a C program that uses recursive and non -function to search for a Key value in a given sorted list of integers using Binary search.
12. 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.

TEXT BOOKS

1. PradipDey, ManasGhosh, **"Programmingin C**", Oxford University Press, 2nd Edition, 2011.
2. E.Balagurusamy, "**Computer Programming in C"**, Tata McGraw Hill, 1st Edition, 2013.

REFERENCES

1. Brian W. Kernighan, Dennis M. Ritchie, "**The C Programming Language"**, PHI, 2nd Edition, 1990.
2. Greg Perry and Dean Miller, "**C ProgrammingAbsolute beginner's guide**", QUE Publishers, 3rd Edition, 2013.
3. Paul Deitel and Harvey Deitel, "**C How to Program"**, PHI, 7th Edition, 2012.
4. Behrouz A. Forouzan, E.V.Prasad, Richard F.Gilberg, "**C programming: A Problem- Solving Approach**", Cengage Learning Press, 1st Edition, 2011.

Course Outcomes

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

1. Analyze concepts in problem solving do programming in C language and write diversified solutions using C language.
2. Identify situations where computational methods and computers would be useful.
3. Understand the programming tasks using techniques learned and write pseudo-code.
4. Compare the program on a computer, edit, compile, debug, correct, recompile and run it.
5. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. I Semester		
Code: 70A01	NSS AND SPORTS/YOGA (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: NIL		-	-	2

Prerequisites: NIL

Course objective:

To develop physical skills and fitness specific to a particular 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 **6 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 II **6 Periods**

Volunteerism and Shramdan- needs &Importance of Volunteerism, Motivation and Constraints of Volunteerism, Shramdan as a part of Volunteerism.

MODULE III **6 Periods**

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

MODULE IV **6 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 V **6 Periods**

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.

TEXT BOOKS:

1. Christopher G. Petre, **"Social Work with Children and Their Families: Pragmatic Foundations "**, Journal Vol:24, No.3, September 18th, 2003, 2nd Edition.

REFERENCES:

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. Rashmi Bansal, "**Stay Hungry Stay Foolish",** 1st December 2008.
8. Beverly Schwartz, "**Rippling: How Social Entrepreneurs Spread Innovation Throughout the World"**, Published by Jossey – Bass, May 27th 2012.

E Resources:

1. http://nptel.ac.in/courses/109106059/11
2. http://nptel.ac.in/courses/109106059/12
3. http://nptel.ac.in/courses/109106059/13
4. http://nptel.ac.in/courses/109106059/14

Course Outcomes:

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

1. Understand the concepts of National Service Scheme (NSS) and its activities.
2. Gain the essence of volunteerism and shramdan
3. Understand the rules and procedures of physical education and its events.
4. Learn the basics of yoga and its benefits to the youth in personality development.
5. Gain the knowledge of managing the environmental issues and self defense activities.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70B02	COMPUTATIONAL MATHEMATICS (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: 4		3	2	-

Prerequisite: Nil

Course Objectives:

The objective of this course is to introduce various numerical techniques which are indispensable tools to solve many algebraic and transcendental equations. Various methods are used to reduce the global error involved in approximations. This course fills into this perceived need. The treatment should be informed by the fact that not only conceptual but also (and in some cases) more importantly numerical or computational methods are of essence.

MODULE I: Algebraic and Transcendental Equations **13 Periods**

Solution of Algebraic and Transcendental Equations: Introduction - Bisection Method - Method of False Position - Iteration Method – Newton-Raphson Method - Ramanujan's Method.

Gauss Jacobi – Gauss Seidel Methods

MODULE II: Interpolation **13 Periods**

Introduction, Errors in Polynomial Interpolation, Finite differences, Forward Differences-Backward differences, Symbolic relations and separation of symbols, Differences of a polynomial-Newton's formulae for interpolation

Central difference interpolation Formulae, Gauss Central Difference Formulae, Interpolation with unevenly spaced points: Lagrange's Interpolation formula.

MODULE III: Curve fitting, Numerical Differentiation & Integration **12 Periods**

A: Curve fitting: Fitting a first degree (linear) and second degree (parabola), exponential, power curves for a data by the Method of least squares.

B: Numerical Differentiation: Evaluation of derivatives, Evaluation of maximum & minimum for a given data. Numerical Integration: Trapezoidal Rule, Simpson's $1/3^{rd}$, 3/8 Rule.

MODULE IV: Numerical solution of Ordinary Differential Equations **13 Periods**

Solution by Taylor's series method - Picard's Method of successive Approximations - Euler's Method-Modified Euler's Method – Runge-Kutta Methods. Predictor-Corrector Methods: Milne's method - Adams- Bashforth Method.

MODULE V: Numerical Solution of Partial Differential Equations **13 Periods**

Classification of second order equations – Finite difference approximations to derivatives - standard 5 point formula – diagonal 5 point formula – solution of Laplace equation.

Solution of poission's equation.Solution of one dimensional heat, wave equations (by Crank-Nicolson explicit/implicit formula only).

TEXT BOOKS

1. S.S. Sastry **"Introductory Methods of Numerical Analysis"**, Prentice-Hall of India Private Limited, 4th edition.
2. B.S. Grewal, **"Higher Engineering Mathematics",** Khanna Publishers, 43rd Edition, Reprint 2011.

REFERENCES

1. R.K. Jain & S.R.K. Iyengar **"Advanced Engineering Mathematics"**, Narosa Publications Delhi, 3rd edition.
2. Kanti B. Datta **"Mathematical Methods of Science and Engineering",** Cengage Learning.
3. Alan Jeffrey **"Mathematics for Engineers and Scientists"**, Chapman & Hall/ CRC, 6th Edition 2013
4. Michael Greenberg **"Advanced Engineering Mathematics"**, Pearson Education Second Edition.

E-RESOURCES

1. http://www.simumath.com/library/book.html?code=Alg_Equations_Examples (Algebraic and transcendental equation text book by YURG BERENGARD)
2. http://jupiter.math.nctu.edu.tw/~smchang/9602/NA_lecture_note.pdf (Interpolation)
3. http://www.essie.ufl.edu/~kgurl/Classes/Lect3421/Fall_01/NM5_curve_f01.pdf(Curvefitting)
4. http://nptel.ac.in/courses/104101002/downloads/lecturenotes/module1/chapter6.pdf (Numerical Differentiation and Integration)
5. http://www.sam.math.ethz.ch/~hiptmair/tmp/NPDE10.pdf (Numerical Solution of Partial Differential Equations)
6. https://www.jstor.org/stable/27953736?seq=1#page_scan_tab_contents(Algebraicandtranscendental equation by William L. Schaaf)
7. http://www.ijcsi.org/papers/IJCSI-9-6-2-413-419.pdf(Algebraic and transcendental equation by Md. Golam Moazzam)
8. http://www.iosrjournals.org/iosr-jm/papers/Vol6-issue6/J0665862.pdf (Interpolation)
9. http://www.wseas.org/multimedia/journals/mathematics/2014/a045706-398.pdf(Curvefitting)
10. http://nptel.ac.in/courses/122102009 (Algebraic and transcendental equation)
11. http://nptel.ac.in/courses/112104035/14 (Mathematical methods in engineering and science by Prof. Bhaskar Dasgupta)
12. http://nptel.ac.in/courses/111107063 (Numerical solution of Ordinary Differential Equations)
13. http://nptel.ac.in/courses/111105038 (Numerical Solution of Partial Differential Equations)

Course Outcomes

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

1. Apply numerical methods to solve some algebraic and transcendental equations to the desired level of accuracy.
2. Application of interpolation concept to evaluate missed data in data analysis.
3. Application of least squares method to solve data analysis problems and able to find the differentiation and integration by using numerical techniques.
4. Apply differential equations in engineering oriented problems and to observe patterns by using numerical techniques.
5. Find out the Numerical solution of partial differential equations.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70B08	APPLIED PHYSICS (Common to EEE, ECE,CSE and IT)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

The main objective of this course is to provide the basic physics principles, would help engineers to understand the tools and techniques used in the industry and provide the necessary foundations for inculcating innovative approaches. This would create awareness about the vital role played by science and engineering in the development of new technologies.

MODULE I: Electromagnetic Theory **9 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 and its modification, Faraday's law of electromagnetic induction, Induced E.M.F in a conductor, Lenz's Law , Maxwell equations in differential form, wave equation for free space, Poynting theorem.

MODULE II: Dielectric Properties of Materials **9 Periods**

Electric dipole, Dipole moment, Dielectric constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities - Electronic and ionic; Qualitative treatment of Internal Fields in solids, Clausius - Mossotti Equation, Piezo-electricity, Ferro- electricity, Barium titanate, Applications of Ferroelectric materials.

MODULE III: Laser& Fiber Optic Materials **13 Periods**

A: Laser: 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; Nd: YAG LASER; Semiconductor Diode LASER; Applications of LASER - drilling, welding, data storage, optical signal processing and nuclear fusion.

B: Fiber Optic Materials**:** 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, Fiber materials, Application of Optical Fibers - Medical, Level sensor and Communication system.

MODULE IV: 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.

MODULE V: Semiconductor Physics **9 Periods**

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; Direct and Indirect band gap semiconductors, Photo conductivity, optical response, LED materials, Construction of LED.

TEXT BOOKS

1. K.Vijaya Kumar, S Chandralingam, "**Modern Engineering Physics**'' Volume I & II, S. Chand, 1st Edition, 2017.
2. M. N.Avadhanulu, P. G.Kshirsagar, " **A Textbook of Engineering Physics"**, Revised Edition 2014.

REFERENCES

1. S. L. Gupta & Sanjeev Gupta, "Unified **Physics - Electricity, Magnetism and Electronics"**, Jai PrakashNath Publications, 47th Edition 2017.
2. P. K.Palanisamy, "**Engineering Physics"**, 4th Edition, SciTech Publications, 2014.
3. Ghatak Ajay and Lokanatham, "**Quantum Mechanics"**, Springer Publications, 1stEdition, 2014.
4. G Prasad and Bhimashankaram, "**Engineering Physics"**, B S Publications, 3rdEdition, 2008.
5. Sulabha K. Kulkarni, "**Nano technology - Principles and practices"**, Springer Publications. 3rd Edition, 2014.

E -RESOURCES

1. http://www.gistrayagada.ac.in/gist_diploma/PHYSICS-StudyMaterial.pdf
2. http://www.faadooengineers.com/threads/3300-Applied-Physics-Ebooks-pdf-free-download?s=1b6cb6b1de4e7152298bd9d60156cd11
3. http://aip.scitation.org/journal/jap
4. http://www.springer.com/physics/journal/340
5. https://www.youtube.com/watch?v=nGQbA2jwkWI
6. http://nptel.ac.in/courses/115101005/1
7. http://nptel.ac.in/courses/115106061/13

Course Outcomes

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

1. Apply basic knowledge on electromagnetic principles and using these wave equations for the propagation
2. Recognize the dielectric properties of matter.
3. Be aware of the concepts and applications of LASER and Optical fibers.
4. Analyze the formation the bands thereby classification of materials on the basis of transport properties.
5. Explore the concepts of semiconductors physics, which is basic to the electronics engineering.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70B10	APPLIED CHEMISTRY (Common for CE,EEE,ME,ECE,CSE,IT and Min.E)	L	T	P
Credits: 4		4	-	-

Pre-requisite: Nil

Course Objectives: The purpose of this course is to emphasize the relevance of fundamentals and applications of chemical sciences in the field of engineering and to provide basic knowledge on electrochemistry, batteries, corrosion, applications of conducting polymers in various fields, fuels in day to day life and the concepts of composites, Nano materials and green chemistry.

MODULE I: Water **12 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 and boiler corrosion; 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 **13 Periods**

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

B: Corrosion: 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), Electroless plating of Nickel.

Module III: Polymers **13 Periods**

A: Types of Polymerization-Chain (Free radical Mechanism)&Step growth. Plastics: Thermoplastic & Thermosetting plastics, Compounding& fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon, Nylon – 6,6 and Bakelite.

B: Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. Bio degradable polymers: poly lactic acid and poly vinyl acetate. Elastomers: Natural Rubber-vulcanization. Synthetic Rubber- preparatrion, properties and applications of BuNa-S, Butyl rubber. Fibre-reinforced polymers-properties and applications.

Module IV: Fuels and Combustion **13 Periods**

Fuels: 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, synthesis of petrol by Fisher- Tropsch method. Knocking – octane and cetane rating. Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG.

Combustion: Combustion-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 13 Periods

Composites: Basics of composites, composition and characteristics-types of composites –particle and fiber reinforced composites and their applications. Concept of Bio-fuels (Biodiesel, Bioethanol and Biogas), Biosensors, Biosurfactants.

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

Green Chemistry: Introduction, principles of green chemistry, introduction to ultrasonic and microwave assisted reactions, solvent free reactions. Concept of R4M4 (Reduce, Reuse, Recycle, Redesign; Multipurpose, Multidimensional, Multitasking and Multi-tracking) model with special reference of Econoburette, Survismeter.

TEXT BOOKS

1. P. C. Jain and Monica Jain, "**A text Book of Engineering Chemistry"**, Dhanpat Rai Publications, New Delhi, 12th Edition 2006.
2. M. Thirumala Chary and E. Laxminarayana, **"Engineering Chemistry"** by SciTech publications (INDIA) PVT Ltd, Third Edition, 2016 .

REFERENCES

1. B. Rama Devi, Ch. VenkataRamana Reddy and Prasantha Rath**, "Text Book of Engineering chemistry"** by Cengage Learning India Pvt.Ltd, 2016.
2. F.W. Billmeyer, "**Text Book of Polymer Science"**, John Wiley & Sons, 4th Edition, 1996.
3. M.G. Fontana, N. D. Greene, "**Corrosion Engineering"**, McGraw Hill Publications, New York, 3rd Edition, 1996.
4. B. R. Puri, L. R. Sharma & M. S. Pathania, "**Principles of Physical Chemistry",** S. Nagin Chand &Co., New Delhi, 23rd Edition, 1993.
5. G. A. Ozin and A.C. Arsenault, "**Nanochemistry: A Chemical Approach to Nanomaterials**", RSC Publishing, 3rdEdition, 2005.

E -RESOURCES

1. https://books.google.co.in/books?isbn=0070669325 (Engineering chemisty by Sivasankar)
2. https://www.youtube.com/watch?v=yQUD2vzfgh8 (Hot dipping Galvanization)
3. Journal of Industrial & Engineering chemistry (Elsevier)
4. Journal of fuel chemistry & Technology (Elsevier)
5. nptel.ac.in/courses/113108051/ (corrosion &electrochemistry web course)
6. http://nptel.ac.in/course.php (Material chemistry video& web courses)

Course Outcomes

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

1. Acquire knowledge on Water treatment, specifically hardness of water.
2. Acquire knowledge on Electrochemical cell, fuel cells, batteries and its applications.
3. Know 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.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70201	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

To introduce the concept of electrical circuits and its components. To introduce the characteristics of various electronic devices. To impart the knowledge of various configurations, characteristics and applications of electrical & electronic components.

MODULE I: Introduction to Electrical Circuits 10 Periods

Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources - Source transformation – Voltage and Current relationship for passive elements – Series, parallel, series-parallel, star-to-delta and delta-to-star transformation. Kirchhoff's laws – KCL and KVL, Loop and Nodal analysis of Networks with independent voltage and current sources.

MODULE II: Magnetic Circuits 9 Periods

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

MODULE III: Single Phase A.C. Circuits 10 Periods

A: R.M.S and Average values and form factor for sinusoidal wave forms, Steady state analysis of pure R, L and C with sinusoidal excitation.

B: Steady state analysis of series RL, RC, RLC - Concept of Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference – Power factor, Real and Reactive powers.

MODULE IV: Semiconductor Diode Characteristics 10 Periods

Qualitative theory of the p-n junction, the p-n junction as a diode, band structure of an 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 CT, diffusion capacitance, breakdown mechanism in diode, Zener diode, V-I characteristics of Zener diode.

MODULE V: Diode Applications & Special Semiconductor Devices 9 Periods

Diode Applications: Introduction, load line analysis, series diode configurations, parallel and series-parallel configuration, half-wave rectification, full-wave rectification, general filter considerations, Inductive, Capacitive, LC and CLC filters, Zener diode as voltage regulator. **Special Semiconductor Devices**: Principle of operation, Characteristics and applications of Tunnel diode, Varactor diode, Photo Diode, LED, LCD.

TEXT BOOKS

1. M. Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, **" Basic Electrical and Electronics Engineering"**, S. Chand and Company Limited, New Delhi, 1st Edition, 2017.
2. R. L. Boylestad and Louis Nashlesky, **"Electronic Devices & Circuit Theory"**, Pearson Education, 2007.

REFERENCES

1. V. K. Mehtha and Rohit Mehta, **"Principles of Electrical Engineering and Electronics"**, S. Chand & Co., 2009.
2. Jacob Milliman, Christos C .Halkias, Satyabrata Jit (2011), **"Electronic Devices and Circuits"**, 3rd edition, Tata McGraw Hill, New Delhi.
3. Thomas L. Floyd and R. P. Jain, "**Digital Fundamentals"**, Pearson Education, 2009.
4. David A. Bell, **"Electronic Devices and Circuits"**, Oxford University Press, 2008.
5. Nagrath I.J. and D. P. Kothari, "**Basic Electrical Engineering"**, Tata McGraw Hill, 2001.
6. Mittle N., **"Basic Electrical Engineering"**, Tata McGraw Hill Education, New Delhi, 2nd Edition, 2005.

E - RESOURCES

1. https://www.electrical4u.com/ohms-law-equation-formula-and-limitation-of-ohms-law/
2. https://www.eeweb.com/passives
3. http://nptel.ac.in/courses/108108076/
4. http://nptel.ac.in/downloads/108105053/

Course Outcomes

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

1. Apply basic laws in electrical circuit.
2. Apply the faraday's laws of electromagnetism to real world.
3. Analyze the response of AC network.
4. Know the practical importance of Diode and its characteristics.
5. Recognize the operation of Diode and its applications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70503	DATA STRUCTURES (Common for EEE, ECE, CSE and IT)	L	T	P
Credits: 4		4	-	-

Prerequisites: Computer Programming

Course Objectives:
This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

MODULE I: Performance Analysis and Introduction to data structures **12 Periods**
Performance Analysis: Algorithm definition and characteristics, time and space complexity, Asymptotic Notations – Big O, Omega and Theta notations.
Introduction to data structures: Types of data structures: Linear and Non-linear data structures. Recursion definition- Linear and Binary recursion, Design methodology and implementation of recursive algorithms, Recursive algorithms for Towers of Hanoi.

MODULE II: Linked Lists **13 Periods**
Single Linked Lists: Definition, Operations-Insertion, Deletion and Searching, Concatenating single linked lists, Circular linked lists, Operations- Insertion, Deletion.
Double Linked Lists: Definition, Operations- Insertion, Deletion. Applications of Linked list. Sparse matrices - Array and linked representations.

MODULE III: Stacks and Queues **13 Periods**
A: Stacks: 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: Basic queue operations, Representation of a queue using array and Linked list, Classification and implementation – Circular, Enqueue and Dequeue, Applications of Queues.

MODULE IV: Trees and Graphs **13 Periods**
Trees: Basic concepts of Trees, Binary Tree: Properties, Representation of binary tree using array and linked lists, operations on a binary tree, binary tree traversals, creation of binary tree from in, pre and post-order traversals, Tree traversals using stack, Threaded binary tree.
Graphs: Basic concepts of Graphs, Representation of Graphs using Linked list and Adjacency matrix, Graph algorithms, Graph traversals- (BFS & DFS).

MODULE V: Search Trees **13 Periods**
Binary Search Trees and AVL Trees: Binary Search Tree, Definition, Operations - Searching, Insertion and Deletion, AVL Trees (Elementary treatment-only Definitions and Examples).
B-Trees and Red-Black Tree: B-Trees, Red-Black and Splay Trees (Elementary treatment-only Definitions and Examples), Comparison of Search Trees.

TEXT BOOKS

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

REFERENCES

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.

E-RESOURCES

1. http://gvpcse.azurewebsites.net/pdf/data.pdf
2. http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data-Structures.pdf
3. http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247-Page1.htmhttp://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7-3lcmoMApVUMmjlExpIb1zste4YXX1pSpX8a2mLgDzZ-E41CJ6PVmY4S0MqVbxsFQ
4. http://nptel.ac.in/courses/106102064/1

Course Outcomes

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

1. Identify the appropriate data structures and analyze the performance of algorithms.
2. Understand and implement single, double, and circular linked-lists.
3. Implement Stacks and Queues using array and linked-list representations.
4. Develop programs by using non linear data structures such as trees and graphs.
5. Design and Implement applications of advanced data structures.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70B11	**APPLIED CHEMISTRY LAB** (Common for CE,EEE,ME,ECE,CSE,IT and Min.E)	**L**	**T**	**P**
Credits: 2		**-**	**-**	**4**

Course objectives:
To provide the students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.

List of Experiments: (Any ten experiments)

1. Calibration of Volumetric apparatus.
2. Estimation of Hardness of water by EDTA Method.
3. Estimation of pH of an acid (Three methods).
4. Estimation of alkalinity of water.
5. Estimation of strength of an acid by Conductometry.
6. Estimation of strength of an acid by Potentiometry.
7. Determination of ferrous ion in cement by colorimeter.
8. Determination of viscosity of given liquids.
9. Preparation of Nylon 6,6.
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.
13. Estimation of Mn^{+2} ion in $KMnO_4$ by Colorimeter.

Course outcomes:

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

1. Estimate the impurities present in water samples.
2. Ability to select lubricants for various purposes.
3. Ability to prepare advanced polymer materials.
4. Ability to know the strength of an acid present in batteries.
5. Ability to find the Fe^{+2} present in unknown substances/ores using titrimetric and instrumental methods.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70504	DATA STRUCTURES LAB (Common for EEE, ECE, CSE and IT)	L	T	P
Credits: 2		-	-	4

Software Requirements: Turbo C

List of Programs:

1. Write a recursive program to 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. Write a program to create a single linked list, with the following operations:
a) Insertion b) Deletion c) Display the elements d) Count no of elements.

3. Write a program to create a circular linked list, with the following operations:
a) Insertion b) Deletion c) Display the elements d) Count number of elements.

4. Write a program to create a double linked list, with the following operations:
a) Insertion b) Deletion c) Display the elements d) Count number of elements.

5. Write a program to implements stack operations using:
a) Arrays b) Linked list

6. Write a program to: a) Evaluate Postfix expression.
b) Convert infix expression into postfix expression

7. Write a program to implements Linear Queue operations using:
a) Arrays b) Linked list

8. Write a program to implements Circular Queue operations using Arrays

9. Write a program to implements Double-ended Queue operations using:
a) Arrays b) Double Linked List

10. 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.

11. Write a program to create a Binary Search Tree (BST) and perform insert and search operations on it.

12. Write a program for implementing the following graph traversal algorithms:
a) Breadth First Search (BFS) b) Depth First Search (DFS)

TEXT BOOKS

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

REFERENCES

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.

Course Outcomes

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

1. Identify the appropriate recursive algorithms and analyze the performance of algorithms.
2. Understand and implement single, double, and circular linked-lists.
3. Implement linear data structures such as Stacks and Queues using array and linked-list representations.
4. Implement non linear data structures such as trees and graphs.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70303	ENGINEERING WORKSHOP (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: 2		-	-	4

Course Objectives:
To understand the usage of hand tools, acquire the skills in model / pattern making and familiarize with various work materials and tools.

I. Trades for Exercises:
At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy
4. House-wiring
5. Foundry
6. Arc welding
7. IT workshop – Hardware identification and connectivity, assembling, disassembling and OS Installation

II. Trades for Demonstration& Exposure

1. Machine shop
2. Plumbing
3. Wood working lathe
4. Identification of Electronic Components
5. Blacksmithy

Course Outcomes

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

1. Knowledge of carpentry process and methods used in the design and fabrication, installation, maintenance and repair of structures and fixtures (e.g., furniture, cabinets) to accomplish work assignments.
2. Assembling together of part and removing metals to secure the necessary joint by using fitting and welding.
3. Understand the hardware components of house wiring.
4. Understand the manufacturing process using machine shop.
5. Analyze the different types of computer hardware and software installation.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 70M01	**COMPUTATIONAL MATHEMATICS LAB** (Common for CE,EEE,ME,ECE,CSE,IT and Min.E)	**L**	**T**	**P**
Credits: Nil		**-**	**-**	**3**

Following Programming is to be done in C Language:

Course Objectives:

The objective of this course is to introduce various numerical techniques which are indispensible tools to solve many algebraic and transcendental equations. Various methods are used to reduce the global error involved in approximation root values in C Language.

MODULE I:

1. Find the roots of Non-linear equation using Bisection method.
2. Find the roots of Non-linear equation using Regula - falsi method.
3. Find the roots of Non-linear equation using Newton-Raphson method.
4. Find the roots of Non-linear equation using Iteration method.

MODULE II:

5. Find the smallest root of non-linear equation using Ramanujan's method
6. Solve the system of non-homogeneous linear equations using Gauss-Jacobi method
7. Solve the system of non-homogeneous linear equations using Gauss-siedal method
8. Lagrange's interpolation for unevenly spaced points

MODULE III:

9. Numerical solution of first order O.D.E. using Euler's method.
10. Numerical solution of first order O.D.E. using 4^{th} order Runge-Kutta method.
11. Numerical Integration using Trapezoidal Rule
12. Numerical Integration using Simpson's Rule

Manual: Numerical Methods in Engineering & Science (with Programs in C, C++ & MATLAB) by B.S. Grewal, Khanna Publisher. 2014

REFERENCES

1. S.S. Sastry **"Introductory Methods of Numerical Analysis"**, Prentice-Hall of India Private Limited, 4^{th} edition.
2. Sankara Rao K. "**Numerical Methods for Scientists and Engineers**", Prentice-Hall. 7^{th} Edition, 2008.

E-RESOURCES

1. www.codewithc.com › Numerical Methods › Numerical Methods & C/C++(Source code for Newton Raphson Method in C)
2. vle.du.ac.in/mod/resource/view.php?inpopup=true&id=13354 (Solutions of Algebraic and Transcendental Equations –Part I)
3. www.dailyfreecode.com › Articles › C Programming › Numerical Methods (Code for program of BISECTION METHOD in C Programming)

4. www.ijcsi.org/papers/IJCSI-9-6-2-413-419.pdf (A Robust method for solving Transcendental Equations by Md.GolamMoazzam)
5. http://paulbourke.net/miscellaneous/interpolation/ (interpolation)
6. http://www.tutorialspoint.com/cprogramming/c_functions.htm (interpolation)
7. https://www.class-central.com/mooc/2486/nptel-introduction-to-programming-in-c (Solutions of Algebraic and Transcendental Equations –Part I)
8. http://freevideolectures.com/Course/2663/Numerical-Methods-and-Programing (Interpolation)
9. http://www.nptel.ac.in/courses/111107063/3 (Numerical solution of first order ordinary differential equation)

Course Outcomes

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

1. Find the root of an Algebraic and Transcendental equations by using various methods in 'C' language.
2. Find the root of non-homogeneous linear equations by using various methods in 'C' language.
3. Find the root of first order O.D equations by using various methods in 'C' language.
4. Find numerical integrations by using various methods in 'C' language.
5. Interpolate the values for unequally spaced points by using various methods in 'C' language.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70B03	ADVANCED CALCULUS (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: 3		2	2	-

Prerequisites: Nil

Course Objectives:
The objective of this course is to familiarize the prospective engineers with techniques in multivariate analysis. It deals with acquainting the students with standard concepts to advanced level that will serve them well towards tackling applications that they would find useful in their profession.

MODULE I: Differential Calculus **10 Periods**
Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's mean value Theorem, Taylor's expansion and Maclaurin's expansion of functions (Without Proofs).
Differentiability of multivariable functions: Jacobian, Functional dependence, Taylor's theorem of two variables (Without Proof) Maxima and Minima of functions of two variables, Lagrange's method of multipliers.

MODULE II: Multiple Integrals **10 Periods**
Multiple integrals- double integrals, Change of order of integration, change of variables- polar and Cartesian coordinates. Triple integrals, change of variables- spherical, cylindrical coordinates.

MODULE III: Vector Differentiation **10 Periods**
A: Scalar and Vector Point functions - Gradient - Directional derivative – Divergence – Curl and Their Physical Interpretation.

B: Irrotational fields and Scalar potentials - angle between two surfaces. Vector Identities

MODULE IV: Vector Integration: **9 Periods**
Line integrals – Work done by a force – Circulation - Potential function, Surface integrals - volume integrals.
Vector integral theorems: Verification of Gauss's Divergence Theorem, Green's and stoke's Theorems (without proof).

MODULE V: Partial Differential Equations **9 Periods**
Introduction to Partial differential equations – Formation –Elimination of arbitrary constants – Elimination of arbitrary functions. Linear Partial differential equations - Lagrangian subsidiary Equations. Non-Linear Partial Differential equations of first order (standard forms). Charpit's method.

TEXT BOOKS

1. Kreyszig "**Advanced engineering Mathematics"** John Wiley &Sons, 10th Edition, 2010.
2. B.S. Grewal **"Higher Engineering Mathematics"** Khanna Publishers, 43rd Edition, 2014.

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, First Edition, 2011.
3. Tom M.Apostol **"Calculus"** volume-II, John Wiley, Second Edition.

E - RESOURCES

1. https://www.math.cmu.edu/~wn0g/2ch6a.pdf (Differential Calculus)
2. http://www.staff.ttu.ee/~lpallas/multipleintegrals.pdf (Multiple Integrals)
3. http://www.mecmath.net/calc3book.pdf (Vector Calculus)
4. https://mat.iitm.ac.in/home/sryedida/public_html/caimna/pde/second/second.html (Partial Differential Equations)
5. http://www.aidic.it/cet/16/51/055.pdf (Differential Calculus)
6. http://www.sciencedirect.com/science/article/pii/0022247X7690216X (Multiple Integrals)
7. https://www.youtube.com/watch?v=lxF2rqry2LM (Differential Calculus)
8. http://nptel.ac.in/courses/122104017/28 (Multiple Integrals)
9. http://nptel.ac.in/courses/111103021/ (Partial Differential Equations)

Course Outcomes:

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

1. Learn the concept of slope of a curve which can be mapped to functions to evaluate mean values and applications of functions of several variables.
2. Understanding the concepts of double and triple integrals in engineering problems.
3. Apply the concept of Gradient, Divergence and Curl of a vector valued functions and scalar valued functions.
4. Verify the Vector Integral theorems in engineering and physical problems.
5. Understand Partial Differential equations and perform its applications to real time applications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70202	ELECTRICAL CIRCUIT ANALYSIS AND SYNTHESIS	L	T	P
Credits: 4		4	-	-

Prerequisites: Basic Electrical and Electronics Engineering

Course Objectives: This course deals about the network theorems and three phase circuits. It also emphasis on network parameters, synthesis and transient analysis of electrical network. It is the foundation for all courses of the Electrical and Electronics Engineering discipline.

MODULE I: Network Theorems (Both AC& DC Networks) 13 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: Resonance and Three Phase Circuits 12 Periods

Resonance: Resonance – Series & parallel circuits, concept of bandwidth and Q factor.
Locus diagrams: Series R-L, R-C, R-L-C Circuits.
Three Phase Circuits: 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 three phase circuits.

MODULE III: Two Port Network Parameters 13 Periods

A: Open circuit impedance (Z) network parameters, Short circuit admittance(Y) network parameters –Transmission (ABCD)
B: 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 (Independent Sources Only) – Solution using Laplace transform approach.

MODULE V: Network Synthesis 13 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 H. Hayt and Jack E. Kimmerly, **"Engineering Circuit Analysis"**, McGraw Hill Company, 6th Edition, 2005.
2. Joseph Edminister and Mahmood Nahvi, **" Electric Circuits"**, Schaum Outline Series, Tata McGraw Hill, 3rd Edition, 1999.

REFERENCES

1. Vanvalken burg, "**Network Analysis**", Prentice Hall of India, 3 rd Edition, 1994.
2. A. Chakrabarthy, "**Circuit Theory**", Dhanpat Rai & Co., 6 th Edition, 2010.
3. N. N. Parker Smith, "**Problems in Electrical Engineering**", Prentice Hall of India, 9th Edition, 1981.
4. Sudhakar A. and Shyammohan S.P., "**Circuits and Networks: Analysis and Synthesis"**, Tata McGraw Hill, New Delhi, 2004.

5. Arumugam M. and Premkumar N., **"Electric Circuit Theory"**, Kanna Publishers, New Delhi, 1991.

E - RESOURCES

1. http://www.ece.ucsb.edu/Faculty/rodwell/Classes/ece2c/resources/two_port.pdf
2. http://nptel.ac.in/courses/117106108/
3. http://nptel.ac.in/courses/108102042/
4. https://www.vssut.ac.in/lecture_notes/lecture1423722706.pdf

Course Outcomes

At the end 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 and understand the resonance concepts.
3. Evaluate the different parameters of a given two port electrical network.
4. Analyze the transient response of a network for the given input.
5. Construct the electrical circuit for the given impedance, admittance functions.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70401	ELECTRONIC CIRCUITS-I (Common for EEE and ECE)	L	T	P
Credits: 3		3	-	-

Prerequisites: Applied Physics, Basic Electrical and Electronics Engineering

Course Objective:

This course provides the basic knowledge for the construction and operation of Bipolar Junction Transistor. It deals with acquainting the students with standard concepts to advanced of the different types and operation of FET's and MOSFET's and to understand different biasing techniques of BJT & FET, study about different amplifiers and understand small signal analysis of different transistor configurations and to study low frequency response of BJT and FET amplifiers.

MODULE I: Bipolar Junction Transistors **10 periods**

Introduction, transistor construction, transistor operation, transistor current components, transistor as an amplifier, Input and output Characteristics of transistor in common base configuration, common emitter configuration and common collector configuration, Relation between alpha and beta, , limits of operation, transistor specifications.

MODULE II: Field Effect Transistors **10 periods**

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

MODULE III: BJT Biasing & FET Biasing **10 periods**

A: BJT Biasing:

Need for biasing, Operating point, load line analysis, bias stabilization techniques: fixed bias, collector to base bias, self-bias, Stabilization against variations in Ico, VBE and β for the self-bias circuit, bias compensation techniques, thermal runaway and thermal stability.

B: FET Biasing:

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

MODULE IV : Amplifiers **10 periods**

Small signal low frequency transistor Amplifier circuits: h-Parameter representation of a Transistor, Analysis of single stage transistor Amplifier (CE, CB, CC) using h-parameters: voltage gain, current gain, input impedance and output impedance. Comparison of transistor configurations in terms of A_i, R_i, A_v, R_o. Analysis of CE Amplifier with Emitter resistance and emitter follower ,Millers theorem and its Dual. Simplified h- parameter Model.

MODULE V: Single Stage Amplifiers **8 periods**

Classification of Amplifiers, Distortion in Amplifiers, Low Frequency response of common emitter Amplifiers, Common Base Amplifiers, common collector Amplifier, Small signal JFET model,JFET Amplifiers: Common Drain Amplifier, Common Source Amplifier and Common gate Amplifier. Gain band width product.Analysis ofCommon Source Amplifier with resistive load.

TEXT BOOKS:

1. Jacob Milliman, Christos C .Halkias, Satyabrata Jit, "**Electronic Devices and Circuits"**, McGraw Hill (India) ,3rd edition, 2013.
2. Shalivahana N. Suresh Kumar, A. Vallavaraj**, "Electronic Devices and Circuits"**, Tata McGraw Hill (India), 3rd edition, 2007.

REFERENCES:

1. Robert Boylestad, Lowis Nashelsky, "**Electronic Devices and Circuit Theory"**, Prentice Hall of India, 5th Edition, 1993.
2. David. A. Bell, "**Electronic Devices and Circuits"**, Prentice Hall of India, 4th Edition, 1986.
3. G. K. Mithal, "**Electronic Devices and Circuits"**, Khanna Publications, 22nd Edition, 1999.
4. Theodore. F. Bogart Jr. Jeffrey S. Beasley, Guillermo Rico, "**Electronic Devices and Circuits",** Pearson Education (India), 6th edition , 2004.

E-RESOURCES:

1. http://electronicsforu.com/
2. https://www.elektormagazine.com/
3. http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?reload=true&punumber=101
4. http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=16
5. http://nptel.ac.in/courses/117101106/6
6. http://nptel.ac.in/courses/117101106/1

Course Outcomes:

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

1. Understand the operation and construction of Bipolar Junction Transistors in various configurations.
2. Understand the operation, types and characteristics of Field Effect Transistors.
3. Study different biasing techniques and design the DC bias circuits using BJT & FET
4. Understand the small signal analysis of different transistor configurations.
5. Understand the low frequency response of BJT and FET amplifiers.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70305	FLUID MECHANICS AND HYDRAULIC MACHINES [Common to EEE, ME and Min.E]	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

The objective of this subject is to provide the knowledge of fluid power and analyze the performance of various hydraulic machines like turbines, compressors and pumps.

MODULE I: Fluid statics **10 Periods**

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.

Hydro static forces on plane and curved surfaces. Buoyancy and floatation: Meta center, stability of floating body, Submerged bodies, Calculation of metacentric height.

MODULE II: Fluid Kinematics & Fluid Dynamics **10 Periods**

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. Velocity potential and stream function – flow net.

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

MODULE III: Closed Conduit Flow & Boundary Layer Concepts **10 Periods**

A: Closed conduit flow: Reynold‘s experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel - total energy line - hydraulic gradient line.

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

MODULE IV: Turbo machinery and Hydraulic Turbines **9 Periods**

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, workdone and efficiency, flow over radial vanes.

Hydraulic Turbines : Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, workdone, efficiencies, hydraulic design – draft tube theory - functions and efficiency. 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 & Reciprocating Pumps **9 Periods**

Centrifugal pumps: Classification, working, workdone – 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. Modi and Seth, "**Hydraulics, fluid mechanics including hydraulic machines**", Standard Publishers, 19th Edition, 2013
2. R.K. Bansal, "**Fluid Mechanics and hydraulic Machines**", Laxmi Publications, 9th Edition, 2010.

REFERENCES

1. R.K. Rajput, "**Fluid Mechanics and Hydraulic Machines**", S.Chand, 5th Edition, 2013.
2. D. Rama Durgaiah, **"Fluid Mechanics and Machinery"**, New Age International (P) Ltd, 1st editions, 2007
3. James W. Dally, William E. Riley **"Instrumentation for Engineering Measurements",** John Wiley & Sons Inc. 3rd editions, 1989.
4. Vijay Gupta and S.K.Gupta, "**Fluid Mechanics and Applications**", New-Age International Ltd. 1999.
5. Banga & Sharma, "**Hydraulic Machines**", Khanna Publishers, 7th Edition, 2007

E - RESOURCES

1. nptel.ac.in/courses/112105183/
2. www.nptelvideos.in/2012/11/fluid-mechanics.htm
3. nptel.ac.in/courses/112104117/
4. www.sanfoundry.com/best-reference-books-fluid-mechanics-and-machinery/
5. https://www.elsevier.com/journals

Course Outcomes

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

1. Know the dimension and units of fundamental properties.
2. Understand the concept of fluid kinematics and dynamics.
3. Understand and solve the problems of closed conduit flow & boundary layer concepts.
4. Analyze the performance of turbo machinery and hydraulic turbines.
5. Understand the principles of centrifugal and reciprocating pumps.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70402	SWITCHING THEORY & LOGIC DESIGN (Common for EEE and ECE)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objective:

This course introduces various number systems and conversion from one number system to other and also to understand different binary codes**,** the theory of Boolean algebra and to study representation of switching functions using Boolean expressions and their minimization techniques. Understanding the combinational logic design of various logic and switching devices and their realization**,** the basic flip flops and sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices, their minimization techniques and their realizations and to analyze a given sequential circuit by using state tables and state diagrams.

MODULE I: Number systems & Binary codes **8 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.

MODULE II: Boolean Algebra & Boolean functions **10 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

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 **10 Periods**

A: Arithmetic circuits: Half adder, full adder, half Subtractor, full Subtractor, binary adder, Carry look ahead adder, BCD adder

B: Code conversion circuits, Comparator, Decoder, Encoder, Priority Encoder, Multiplexers and Design, De – Multiplexers, ROM, PLA, PAL.

MODULE IV: Sequential Logic Circuits - I **10 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.

MODULE V: Sequential Logic Circuits - II **10 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. Zvi Kohavi, **"Switching and Finite Automata Theory"**,TMH, 2nd edition, 2006.
2. Morris Mano,**"Digital Design"**,PHI, 3rd Edition, 2009.
3. A.Anand Kumar,**"Switching Theory and Logic Design"**,PHI 2nd Edition, 2014.
4. John F.Wakerly, **"Digital Design Principles & Practices"**, PHI/ Pearson Education Asia, 3rd Ed., 2005.

REFERENCES:

1. Stephen Brown and Zvonka Vramesic, **"Fundamentals of Digital Logic with VHDL Design"**,McGraw Hill, 2nd Edition, 2008.
2. William I. Fletcher, **"An Engineering Approach to Digital Design"**, PHI, 1st Edition, 2009.

E-RESOURCES:

1. https://www.researchgate.net/publication/264005171_Digital_Electronics
2. https://www.cl.cam.ac.uk/teaching/0708/DigElec/Digital_Electronics_pdf.pdf
3. https://faraday.physics.utoronto.ca/IYearLab/digital.pdf
4. ftp://200.93.248.41/pub/manuales/electronic/Engineering%20-%20Fundamentals%20of%20Digital%20Electronics.pdf
5. http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=30
6. http://ieeexplore.ieee.org/abstract/document/753678/
7. http://docshare01.docshare.tips/files/20257/202573063.pdf
6. http://nptel.ac.in/courses/117106086/1
7. http://nptel.ac.in/courses/117105080/
8. http://nptel.ac.in/courses/117106114/

Course Outcomes:

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

1. Perform radix conversions
2. Minimize a given Boolean function by using K-map or Tabular method
3. Design a combinational circuit
4. Design a sequential circuit by using various flip flops
5. Analyze and minimize the circuitry of a given sequential circuit and will be able to design a sequence detector

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70203	ELECTROMAGNETIC FIELDS	L	T	P
Credits: 4		4	-	-

Prerequisites: Applied Physics – II.

Course Objectives: This course deals about the electrostatics, electric potential, energy density and their applications. It emphasis on magneto statics, magnetic flux density scalar and vector potential and its applications. It also deals with the time varying fields along with their mathematical formulations.

MODULE I: Introduction to Electrostatics 12 Periods

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 13 Periods

Electric dipole – Dipole moment – potential and EFI due to an electric dipole. Conductors and Insulators. 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 13 Periods

A: Static magnetic fields – Biot-Savart's law – Oesterd's experiment - Introduction to permanent magnets, their characteristics and applications. Relation between magnetic flux, magnetic flux density and Magnetic field intensity (MFI) – MFI due to a straight current carrying filament

B: MFI due to circular, square and solenoid current – Carrying wire –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 13 Periods

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 13 Periods

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"**, McGraw-Hill Companies, 7th Edition, 2012.
2. Mathew N. O. Sadiku, **"Principles of Electromagnetics"**, Oxford University Press Inc. 4th Edition, First India Edition, 2009.

REFERENCES

1. J P Tewari, **" Electromagnetics"**, Khanna Publishers, 2nd Edition, 2005.
2. J. D Kraus, **" Electromagnetics"**, Mc Graw-Hill Inc, 4th Edition, 1992.
3. S. Kamakshaiah, **"Electromagnetic Fields"**, Right Publishers, 2007.
4. K.A. Gangadhar, P.M. Ramanathan, **"Electromagnetic Field Theory (Including Antennas and Wave Propagation)"**, Khanna Publications, 16th Edition, 2007**.**
5. Bhag Singh Guru and Hüseyin R. Hiziroglu, **"Electromagnetic Field Theory Fundamentals"**, Cambridge University Press, 2nd Revised Edition, 2009.

E - RESOURCES

1. http://www.tandfonline.com/toc/tewa20/current
2. https://www.eeweb.com/passives
3. nptel.ac.in/courses/108106073/

Course Outcomes

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

1. State and apply the laws of electromagnetic fields to practical circumstances.
2. Determine the electric field intensity resulting from various configurations of charge distribution.
3. Analyze the concepts of magneto static field and solve the magneto static field problems using laws associated with it.
4. Apply the concept of magnetic fields to compute magnetic potential in scalar and vector forms.
5. Apply the concept of electro dynamic fields and analyze the behavior of conductors using laws associated with it.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70311	FLUID MECHANICS AND HYDRAULIC MACHINES LAB (Common to EEE, ME and Min. E)	L	T	P
Credits:2		-	-	4

Course Objectives:

To provide practical knowledge of fluid flow properties, losses, performance testing of hydraulic turbines and hydraulic pumps.

List of Experiments:

1. Performance test on 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 minor losses (sudden contraction, expansion, pipe bend and union) for a given pipeline.
12. Validation of Bernoulli's Theorem.

Course Outcomes

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

1. Analyze the performance of turbines.
2. Analyze the performance of centrifugal and reciprocating pump.
3. Analyze the performance of venturi meter and orifice meter.
4. Determine the minor losses in given pipe system.
5. Demonstrate the Bernoulli's equation in Bernoulli's apparatus.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70204	ELECTRICAL CIRCUITS LAB	L	T	P
Credits: 2		-	-	4

Course Objectives:

To impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics and simulation of time response.

List of Experiments:

1. Verification of Thevenin'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.

Simulation Experiments:

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.

Course Outcomes:

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

1. Reduce the given complex circuit to simple circuit by applying theorems and can verify the theoretical and practical outputs.
2. Find the impedance value of the given circuit at which the maximum power is transferred and also confirms with the practical results.
3. Design a circuit to accept or reject a particular frequency using resonance principle.
4. Estimate the parameters of the given network.
5. Find the magnitudes of voltages and currents in the given circuit.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. III Semester		
Code: 70M02	**GENDER SENSITIZATION** (Common for CE,EEE,ME,ECE,CSE,IT and Min.E)	**L**	**T**	**P**
Credits: Nil		**-**	**-**	**3**

Course Objectives:

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

MODULE I: Understanding Gender

Gender: Why Should We Study It? *(Towards a World of Equals:* Unit -1) Socialization: Making Women, Making Men *(Towards a World of Equals:* Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First Lessons in Caste. Different Masculinities.

Just Relationships: Being Together as Equals *(Towards* a *World of Equals:* Unit *-2)* Mary iKorn and Onler. Love and Acid just do not Mix. Love Letters. Mothers aniJ Fathers. Further Reading: Rosa Parks-The Brave Heart.

MODULE II: Gender And Biology

Missing Women: Sex Selection and Its Consequences *(Towards a World of Equals:* Unit -4) Declining Sex Ratio. Demographic Consequences.
Gender Spectrum: Beyond the Binary *(Towards* a *World of Equals:* Unit -10)
Two or Many? Struggles with Discrimination.
Additional Reading: Our Bodies, Our Health *(Towards a World of Equals:* Unit -13)

MODULE III: Gender And Labour

Housework: the Invisible Labour *(Towards a World* of *Equals:* Unit -3)
"My Mother doesn't Work." "Share the I.oad."
Women's Work: Its Politics and Economics *(Towards a World of Equals:* Unit -7)
Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

MODULE IV : Issues Of Violence

Sexual Harassment: Say Nol *(Towards a World of Equals:* Unit -6)
Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: *"Chdpulum.*
Domestic Violence: Speaking Out *(Towards a World of Equals:* Unit -5)
Is Home a Safe Place? When Women Unite (Film" Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about Sexual Violence *(Towards a World of Equals:* Unit -11)
Blaming the Victim-1 Fought for my Life...." - Further Reading: The Caste Face of Violence.

MODULE V: Gender Studies

Knowledge: Through the Lens of Gender *(Towards a Work/ of Equals:* Unit -5)
Point of View. Gender and the Structure of Knowledge. Further Reading: Unacknowledged Women Artists of Telangana.
Whose History? Questions for Historians and Others *(Towards a World of Equals:* Unit -9)
Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

Essential Reading: All the Units In the Textbook, *"Towards a World of Equals: A Bilingual Textbook on Gender"* written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Mina Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Thant

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

TEXT BOOKS

1. A Suneetha et al, **" Towards a World of Equals: A bilingual Textbook on Gender"**, 2016.

REFERENCES

1. Sen, Amartya**. "More than One Million Women are Missing",** New York Review of Books 37.20 (20 December 1990). Print. We Were Making History...' Life Stories of Women in the ToIrmgana People's Struggle. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. **"By the Numbers: Where Indian Women Work."** Women's Studios Journal (14 November 2012) Available online at: http:// blogs.visj.com/ India real time/2012/11/14/by -the-numbers-where-Indan-womenworkP
3. K. Satyanarayana and Susie Thant (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada htto://harooreollins.co.in/BookDetailasp?Flook Cndet,3732
4. Vimata. "Vantillu (The Kitchen)". Women Writing in India: 600 BC to the Present. Volume II: The 20th Century. Ed. Susie Thaw and K. Lalita. Delhi: Oxford University Press 1995. 599-601.
5. Shatrughna, Veena et al. Women's Work and its Impact on Child Health end Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.
6. Stree Shakti Sanghatana. 'We Were Making I listory ....' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989.

E- RESOURCES

1. http://www.actforyouth.net/resources/rf/rf_gender1_1213.cfm(UNDERSTANDING GENDER)
2. https://www.simplypsychology.org/gender-biology.html(GENDERAND BIOLOGY)
3. http://www.yourarticlelibrary.com/essay/essay-on-gender-issues-in-labour-market-in-india/40442/ (GENDER AND LABOUR)
4. http://journals.sagepub.com/doi/abs/10.1177/1077801200006007004**(ISSUESOF VIOLENCE)**
5. http://www.nordiclabourjournal.org/emner/likestilling **(GENDER AND BIOLOGY)**

Course Outcomes:

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

1. Develop a better understanding of important issues related to gender in contemporary India.
2. Sensitize about the basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Acquire insight into the gendered division of labour and its relation to politics and economics.
5. Develop a sense of appreciation of women in all walks of life.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70A02	**LAW FOR ENGINEERS** (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	**L**	**T**	**P**
Credits: Nil		**-**	**2**	**-**

Prerequisites: Nil

Course Objectives: The objective of the course is to familiarize students (Prospective engineers) with elementary knowledge of laws that would be of utility in their profession.

MODULE I: Indian Legal System **8 Periods**

Introduction to Indian legal system: Constitution of India, sources of law and judicial system.

Contracts and its elements: Contract interpretation, Employment contracts, service contracts, contract of indemnity, employment agreements.

MODULE II: Labour Laws **6 Periods**

Introduction to Labour Laws: Provident fund, ESI, Maternity Benefit (amendments of 2016).
Bonus, Gratuity and welfare measures.

MODULE III: Taxation **6 Periods**

A: Introduction to Taxation: Income tax act, TDS,
B: Goods and Services Tax (GST)

MODULE IV: IT Act and RTI Act **6 Periods**

Information Technology (IT) Act 2000 and cyber laws
Right to Information Act-2005: Evolution and concept; Practice and procedures.

MODULE V: Intellectual Property Rights **6 Periods**

Intellectual property Rights: overview, main forms of IP,
Copyright, Trademarks, and Patents with reference to software, circuits, structures and designs.

TEXT BOOKS:

1. S.K. Kapur - **Human Rights under International Law and Indian Law** - Central Law Agency – 2001

REFERENCES:

2. H.M. Seervai, "**Constitutional Law of India**", Tripathi Publications, 4th Edition, 1991
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 Edition., 2011
6. Maskus, Keith E. "**Intellectual property rights in the global economy",** Institute for International 2000.

E-RESOURCES:

1. https://www.youtube.com/watch?v=YBjyU7ciHpU
2. http://nptel.ac.in/courses/109103024/40
3. http://nptel.ac.in/courses/122105020/12
4. http://nptel.ac.in/courses/122105020/17

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

1. Understand basic concepts of Indian legal system and also the elements of various contracts.
2. Understand the basic concepts of various Labour laws.
3. Gain the basic knowledge of taxation and its procedures.
4. Understand the concept of cyber laws and the legal procedures under IT Act-2000. Also gain the knowledge on Right to Information Act-2005
5. Gain the knowledge of various Intellectual properties and the legal and policy considerations of Intellectual Property Rights.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. III Semester		
Code: 70A03	**INTERNSHIP-I** (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	**L**	**T**	**P**
Credits: Nil		**-**	**-**	**-**

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70B05	SPECIAL FUNCTIONS AND COMPLEX VARIABLE (Common for EEE & ECE)	L	T	P
Credits: 3		2	2	-

Prerequisites: Nil

Course Objectives:
The objective of this course is to familiarize the students, in some detail, about the analysis on Special Functions & Complex Number field. The central idea of analytic functions and transformations will find ready application in many branches of engineering.

MODULE I: Beta, Gamma functions **10 Periods**
Beta function - Definition – other forms of Beta function. Gamma function- Definition - other forms of Gamma function. Relationship between them and Properties.

MODULE II: Legendre's & Bessel's Polynomials **10 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 Polynomials & Properties .

MODULE III: Functions of Complex variable and Conformal mapping **10 Periods**
A:Complex functions and its representation on Argand plane, Concepts of limit, Continuity, Differentiability, Analyticity, Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method.

B: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.

MODULE IV: Complex Integration **9 Periods**
Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized Cauchy's integral formula.

MODULE V: Power series expansions of complex functions and contour Integration
9 Periods
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 – Cauchy Residue theorem.
Evaluation of integrals by indentation
(a) $\int_c^{c+2\pi} f(\cos\theta \ , \sin\theta)d\theta$ (b) $\int_{-\infty}^{\infty} f(x)dx$

TEXT BOOKS
1. Ruel V.Churchill "**Complex variables and Applications",** McGraw Hill Higher Education **,** Eighth Edition.
2. E Kreyszig, "**Advanced Engineering Mathematics"**, John Wiley & Sons, 10th Edition, 2010.

REFERENCES

1. B.S. Grewal, "**Higher Engineering Mathematics"**, Khanna Publishers. 40th Edition, 2014.
2. A. K. Kapoor, "**Complex Variables Principles And Problem Sessions"**, World Scientific Publishers, 1st Edition, 2011.
3. K. B. Datta, "**Mathematics for Engineers",** Cengage Publications, 1st Edition, 2013.
4. J.B. Conway, "**Functions of one complex Variable"**, Narosa Publications, Springer verlag.

E-RESOURCES

1. http://www.math.odu.edu/~jhh/ch25.PDF (Function Of Complex Variable)
2. https://www.math.ust.hk/~maykwok/courses/ma304/06_07/Complex_4.pdf(ComplexIntegration)
3. http://www.math.psu.edu/papikian/Kreh.pdf (Bessel Function)
4. http://iopscience.iop.org/article/10.1088/1757-899X/53/1/012003/pdf(Cauchy'sIntegral Formula)
5. http://www.ias.ac.in/article/fulltext/reso/016/08/0754-0769(SeveralComplex Variable)
6. http://www.nptel.ac.in/courses/111103070/
7. http://nptel.ac.in/courses/111103070/10 (Cauchy-Riemann Equations and Differentiability)
8. http://nptel.ac.in/courses/111103070/16 (Contour Integration)
9. http://nptel.ac.in/courses/111103070/32 (Conformal mapping)

Course Outcomes:

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

1. Evaluate the improper integrals using Beta and Gamma functions.
2. Understand the Bessel's and Legendre's Polynomials.
3. Understand the concept of Analytic function and conformal mapping.
4. Understand the concept of Complex integration.
5. Understand the concepts of Laurent's series, Taylor series expansions of complex functions and Contour integration.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70205	DC MACHINES AND TRANSFORMERS	L	T	P
Credits: 3		3	-	-

Prerequisites: Electrical Circuit Analysis and Synthesis, Electromagnetic Fields.

Course Objectives:

This course introduces the basic concepts of rotating machines. It emphasis on construction and operation of DC generators, DC Motors, Single phase transformers, Auto transformer and poly phase transformers. It also deals about the methods to evaluation the performance of DC Generators, DC Motors and Single phase transformers.

MODULE I: Electro Magnetic Induction & Basic Concepts in Rotating Machines **9 Periods**

Introduction to magnetic circuits – Magnetically induced EMF and force – AC operation of magnetic circuits – Hysteresis & Eddy Current Loss. Energy in magnetic systems – Field energy & Mechanical force – Single and Multiple excited systems. MMF of distributed windings – Magnetic fields in rotating machines.

MODULE II: DC Generators **10 Periods**

Construction & Principle of Operation of DC 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. OCC - 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: DC Motors **10 Periods**

A: Principle of operation – Back E.M.F. - Torque equation – Characteristics and application of shunt, series and compound motors and Speed control.

B: 3 point and 4 point starters – Constant and Variable losses - Calculation of efficiency – Condition for maximum efficiency – Electric Braking – Brake test – Swinburne's test – Hopkinson's test.

MODULE IV: Single Phase Transformers **10 Periods**

Types - Constructional details - EMF equation - Operation on no load and load - Phasor diagrams – Equivalent circuit - Losses and efficiency - Regulation. All day efficiency - Effect of frequency & supply voltage on core losses. OC and SC tests - Sumpner'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 **9 Periods**

Auto transformers - Comparison with two winding transformers - Poly-phase transformers – Poly-phase connections - Y/Y, Y/Δ, Δ /Y, Δ / Δ - Open -Scott connection - Three winding transformers – Tertiary windings - Determination of Zp, Zs and Zt. Inrush Current - Off load and on load tap changing.

TEXT BOOKS

1. J.B.Gupta, **"Theory & Performance of Electrical Machines"**, S.K. Kataria & Sons, 15th Edition, 2015.
2. I.J.Nagrath & D.P.Kothari, **"Electric Machines"** ,Tata Mc Graw Hill, 4th Edition, 2010.

REFERENCES

1. P.S. Bimbra, **"Electrical Machinery"** , Khanna Publishers, New Delhi, 7th Edition, 2011.
2. A.E.Fitzgerald, C.Kingsley and S. Umans, **"Electric Machinery"**, Tata Mc Graw-Hill Companies, 7th Edition, 2013.
3. Ashfaq Husain, **"Electric Machines"**, Danapati Rai & Co, New Delhi, 2002.
4. S.K.Bhattacharya, **"Electrical Machines"**, Tata McGraw Hill, New Delhi, 4th Edition, 2014.
5. M.V. Deshpande, **"Electrical Machines"**, PHI Learning Pvt. Ltd., 2011.

E - RESOURCES

1. https://www.electrical4u.com/electrical-motor-types-classification-and-history-of-motor/
2. https://www.eeweb.com/electromechanical
3. http://nptel.ac.in/courses/108105017

Course Outcomes

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

1. Apply the magnetic induction principles and have the awareness on basic concepts of rotating machines.
2. Analyze the performance of DC generators.
3. Analyze the performance of DC motors and starting methods of DC motor.
4. Evaluate the performance of single phase transformer.
5. Understand the construction and operation of poly phase transformers and auto transformer.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70206	POWER GENERATION AND DISTRIBUTION	L	T	P
Credits: : 3		3	-	-

Prerequisites: Applied Chemistry, Electrical Circuit Analysis and Synthesis

Course Objectives:

This course deals about the layout of different types of power stations and various power distribution systems. It also emphasis on the importance of economic aspects & tariff.

MODULE I: Power Stations **9 Periods**

Thermal Power Stations: 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 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: Hydroelectric Power Stations and Turbines **10 Periods**

Hydroelectric Power Stations: Elements of hydro electric power station – Types - Concept of pumped storage plants - Storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area - Heads and efficiencies.

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.

MODULE III: Air & Gas Insulated Substations **10 Periods**

A: 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.

B: Introduction to Gas insulated substations, Single line diagram of gas insulated substations, bus bar, Construction aspects of GIS, Maintenance and Advantages of GIS, Comparison of Air insulated substations and Gas insulated substations.

MODULE IV: D.C. and A.C Distribution Systems **10 Periods**

Classification of Distribution Systems - Comparison of DC vs AC Distribution Systems, 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 V: Economic Aspects of Power Generation & Tariff Methods **9 Periods**

Define - 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",** S.Chand & Company Ltd , New Delhi, 2004.
2. PSR. Murty**, "Electrical Power Systems",** Butterworth-Heinemann Publications, 2017.

REFERENCES

1. R. K. Rajput, **"A Text Book of Power System Engineering"**, Laxmi Publications (P) Limited, 2nd Edition, 2016.
2. S.N.Singh , **"Electrical Power Generation, Transmission and Distribution"** , PHI Learning Pvt. Ltd., 2nd Edition, 2008.
3. C.L.Wadhwa, **"Electrical Power Systems"**, New Age international (P) Limited, 6th Edition, 2010.
4. Dr.B.R.Gupta, **"Generation of Electrical Energy"** , S.Chand & Company Ltd , 6th Edition, 2008.
5. G.Ramamurthy, **"Handbook of Electrical power Distribution"**, Universities Press, 2013.

E - RESOURCES

1. https://www.electrical4u.com/power-plants-types-of-power-plant/
2. http://spectrum.ieee.org/energy
3. http://nptel.ac.in/courses/108102047/

Course Outcomes

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

1. Understand the layouts of Thermal Power station, Nuclear Power Plant and Gas Power plant.
2. Demonstrate the operation of hydro electric power plants and turbines.
3. Comprehend about various types of substations and its equipment.
4. Analyze the voltage drops in DC and AC distribution systems.
5. Evaluate the cost of generation and tariff.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70207	ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	L	T	P
Credits: 3		2	2	-

Prerequisites: Applied Physics, Electrical Circuit Analysis and Synthesis.

Course Objectives: This course deals about the different types of instruments to measure electrical quantities, various kinds of bridges for measurement of electrical parameters, measurement of high voltage and current by instrument transformers. It also emphasis on electronic measurements and measurement of physical quantities by transducers.

MODULE I: Measuring Instruments 10 Periods

Classification of measuring Instruments - Methods of measurements, Block Diagram - Measurement system, Types of Errors, Deflecting, Control and Damping Torques PMMC, Moving iron type instruments - Expression for the deflecting torque and control torque-Extension of range using shunts and series resistance, dynamometer type instruments, Electrostatic Voltmeters.

Measurement of Power and Energy:

Electro – Dynamic wattmeter, Wattmeter methods, Three ammeter and three voltmeter methods - for low frequency power measurement, Single phase energy meter, Errors and compensation testing by phantom loading using R.S.S. meter - Power factor meters.

MODULE II: Measurement of Resistance, Inductance and Capacitance 10 Periods

Measurement of low, medium and high resistances – Wheatstone's bridge, Carey Foster's bridge, Kelvin's double bridge, insulation resistance measurement, loss of charge method, Megger, Wagner's Earthing device.

AC bridges:

Inductance measurement - Maxwell's bridge, Hay's bridge, Anderson's bridge, Owen's bridge C**apacitance measurement** – De-Sauty's bridge, Schering Bridge (LV & HV bridges), Wein's bridge.

MODULE III: Instrument Transformers 10 Periods

A: Current and Potential transformers, ratio and phase angle errors, testing and measurement of power using instrument transformers.

B: Potentiometers: Applications and DC potentiometers Principle and operation of D.C. Crompton's potentiometer – standardization –AC polar and coordinate types standardization – Measurement of unknown resistance, current, Calibration of Voltmeters and Ammeters using potentiometers.

MODULE IV: Electronic Measurements 9 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 9 Periods

Transducers, classification & selection of transducers, Calibration, Calibration procedures. Resistance transducer - Strain gauges, inductive transducers - LVDT & 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 – Introduction and block diagram.

TEXT BOOKS

1. A.K. Sawhney, **"A Course in Electrical and Electronic Measurements and Instrumentation"**, Dhanpat Rai & Sons Publications, New Delhi, 2012.
2. E. W. Golding & F. C. Widdis, **"Electrical Measurement & Measuring Instrument"**, 5th Edition, A.H.Wheeler & Co., India, 2011.

REFERENCES

1. Jones, B.E, **"Instrumentation Measurement and Feedback"**, Tata McGraw Hill, 1986.
2. Helfrick Albert D, Cooper William. D, **"Modern Electronic Instrumentation and Measurement Techniques",** Prentice-Hall of India, Reprint 1992.
3. J. B. Gupta, **"A Course in Electronic and Electrical Measurements"**, S. K. Kataria & Sons, Delhi, 2003.
4. Doebelin E.O. and Manik D.N., **"Measurement Systems – Applications and Design"**, Tata McGraw Hill Education Pvt. Ltd., Special Indian Edition, 2007.
5. D.V.S. Moorthy, **"Transducers and Instrumentation"**, Prentice Hall of India Pvt. Ltd., 2007.

E - RESOURCES

1. https://www.electrical4u.com/electrical-measuring-instruments-types-accuracy-precision-resolution-speed/
2. https://www.eeweb.com/test-and-measure
3. https://www.youtube.com/watch?v=moSUpIRCKMk

Course Outcomes

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

1. Understand the methods of measurement and its types.
2. Determine the circuit parameters (R, L and C) using bridges.
3. Understand the principle of operation current and potential transformers (Instrument Transformers).
4. Comprehend the construction, operation and application of electronic voltmeter, millimeter, wattmeter & energy meter and understand the measurement of parameters using CRO.
5. Explain the function and working of various transducers for measuring physical quantities.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70208	POWER TRANSMISSION SYSTEMS	L	T	P
Credits: 3		2	2	-

Prerequisites: Electro Magnetic Fields, Electrical Circuit Analysis and Synthesis.

Course Objectives: This course deals with basic theory of transmission lines modeling and their performance analysis. Also this course gives emphasis on mechanical design of transmission lines, cables and insulators.

MODULE I: General 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 II: Performance of Transmission Lines **10 Periods**

Classification of Transmission Lines - Short, Medium and Long Line and Their Exact Equivalent Circuits- 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 & Overhead Line Insulators **10 Periods**

A: 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.

B: 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 **9 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).

MODULE V: Cables **9 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 and William D Stevenson, **"Power System Analysis"**, Tata McGraw Hill Edn., 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. M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakrabarti, **"A Text Book on Power System Engineering"**, Dhanpat Rai & Co Pvt. Ltd., 2003.
4. S.N. Singh, **"Electric Power Generation, Transmission and Distribution"**, Prentice Hall of India Pvt. Ltd, New Delhi, 2nd Edition, 2011.
5. Luces M.Fualken berry and Walter Coffer, **"Electrical Power Distribution and Transmission"**, Pearson Education, 2007.

E - RESOURCES

1. https://www.electrical4u.com/types-of-electrical-insulator-overhead-insulator/
2. http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/power-system/chapter_2
3. http://nptel.ac.in/courses/108102047/

Course Outcomes

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

1. Evaluate the parameters of transmission line for various configurations.
2. Model the transmission line and analyze their performance.
3. Estimate the number of insulators based on string efficiency.
4. Determine reflection and refraction coefficients of the lines with various terminations.
5. Illustrate different types of cables and describe grading of cables.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70408	PULSE & DIGITAL CIRCUITS (Common for EEE and ECE)	L	T	P
Credits: 3		3	-	-

Prerequisites: Switching Theory & Logic Design, Electronic Circuits-I

Course Objective:

This course provides the knowledge of different types of non-sinusoidal signals and understanding responses of sinusoidal and non-sinusoidal signals to high pass and low pass RC circuits. It also introduces Diode and transistor clippers, Clampers and their types ,Transistor switching times and Transistor as switch design, multivibrators ,different types of multivibrators , Aplicative areas of multivibrators and Schmitt trigger.It also explains different types of sampling gates like unidirectional, bidirectional, four-diode gates, different types of logic families like RTL, TTL, ECL, DCTL and CMOS gates,methods of generating time base wave forms , boot strap and Miller sweep generator, synchronization wrt multivibrator circuits

MODULE I: Linear Wave Shaping **8 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 ntegrator, attenuators, High pass and low pass RL circuits, Applications of High pass and low pass RC circuits.

MODULE II: Non-Linear Wave Shaping **10 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 **10 Periods**

A: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.

B: 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 **10 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.
2. Anand Kumar, **"Pulse and Digital Circuits"**, Prentice Hall of India, India, 2005.

REFERENCES

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.

E-RESOURCES:

1. http://sureshq.blogspot.in/2015/12/pulse-and-digital-circuits-unit-2-and-3.html
2. http://wps.pearsoned.com/wps/media/objects/10581/10835513/Chapter4.pdf
3. http://www.radio-electronics.com/info/circuits/
4. http://electronicsforu.com/
5. http://www.tandfonline.com/toc/tetn19/current
6. http://www.serialsjournals.com/journal-detail.php?journals_id=315
7. https://www.youtube.com/watch?v=iMG1-_rCGjI
8. https://www.youtube.com/watch?v=ttSxAdPM5XU&list=PLBlnK6fEyqRiwZRqfnlVIBz9dxrqHJS&index=52
9. https://www.youtube.com/watch?v=iMG1-_rCGjI
10. https://www.youtube.com/watch?v=O4QaVzNnh-I&t=1510s
11. http://nptel.ac.in/courses/117107095/6
12. nptel.ac.in/courses/122106028

Course Outcomes:

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

1. Analyze the High pass and low pass RC circuit's response for various non sinusoidal signals can be understood clearly.
2. Analyze and design different types of Clippers and Clampers along with reference voltages. Also switching times of Diodes and transistors can be understood.
3. Design and analyze Astable, Bistable and Monostable mutivibrators.
4. Analyze diode sampling gates (uni- directional and Bi-directional) and how to realize the logic gates using various logic families such as DTL, RTL, TTL, CMOS etc.,
5. Analyze and design voltage time base wave forms and know the importance of synchronization.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70405	**ELECTRONIC CIRCUITS-I LAB** (Common for EEE and ECE)	**L**	**T**	**P**
Credits: 2		**-**	**-**	**4**

Course Objective:

To get practical knowledge about basic electronic devices like Diodes, BJT, FET, SCR and UJT

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

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

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.

Course Outcomes:

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

1. Identify the different Electronic Components
2. Design Diode Based Circuits
3. Design Different Rectifier Circuits
4. Differentiate the Transistors and their Operations
5. Simulates the Electronics Circuits in Simulation Software

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70209	DC MACHINES LAB	L	T	P
Credits: 2		-	-	4

Course Objectives:

To provide students with a strong back ground in different types of electrical machines. To train the students with well practical knowledge of different DC machines.

List of Experiments:

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 shunts 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.

Course Outcomes

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

1. Assess the performance of DC shunt, series and compound motors.
2. Determine the efficiency of DC shunt, series and compound motors.
3. Perform the speed control methods of DC shunt motor.
4. Predetermine the efficiency of DC shunt motor.
5. Determine the performance characteristics of DC machines.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70210	ELECTRICAL MEASUREMENTS LAB	L	T	P
Credits: 2		-	-	4

Course Objectives:

To impart the basic knowledge of measuring instruments. Train the students for obtaining solid foundation in measurement of the basic electrical elements like resistance, inductance, capacitance and measurement of power and energy.

List of Experiments:

1. Calibration and Testing of single phase energy Meter.
2. Calibration of dynamometer power factor meter.
3. Calibration of LVDT.
4. Measurement of Resistance using Kelvin's Double Bridge.
5. Measurement of Capacitance using Schering Bridge & De-Sauty Bridge.
6. Measurement of Inductance using Anderson Bridge & Maxwell's Bridge.
7. Measurement of 3 phases reactive power with single wattmeter.
8. Measurement of choke coil parameters using 3 voltmeter and 3 ammeter method.
9. Calibration of LPF wattmeter by Phantom Loading.
10. Measurement of 3 phase power with single wattmeter and Two Watt Meter method.
11. Calibration of single phase energy Meter by Phantom Loading.
12. Measurement of Strain by using Resistance strain gauge.

Course Outcomes

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

1. Calibrate the single phase energy meter, power factor meter and LVDT.
2. Measure resistance by using various bridges.
3. Determine the inductance, capacitance by using various bridges.
4. Calibrate the energy meters by phantom loading.
5. Measure the three phase power by different methods.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. IV Semester		
Code: 70M03	ENVIRONMENTAL SCIENCE (Common for CE,EEE,ME,ECE,CSE,IT and Min.E)	L	T	P
Credits: Nil		-	2	-

Prerequisites: Nil

Course Objectives:

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 problem of environment.

Module I: Ecosystems **5 Periods**

Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy.

Module II: Natural resources, Biodiversity and Biotic resources

Natural Resources **8 Periods**

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

Biodiversity and Biotic resources

Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Threats to Biodiversity (habitat loss, poaching of wildlife, man-wild life conflicts). Conservation of Biodiversity (In-situ and Ex-situ conservation)

Module III: ENVIRONMENTAL POLLUTION AND CONTROL **7 Periods**

A. Classification of pollution and pollutants, Causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards.

B. Soil Pollution, Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, Coastal pollution due to sewage and marine disposal of industrial effluents. E-waste and its management.

Module IV: Global Environmental Problems and Global Effects **6 Periods**

Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

Module V: Towards Sustainable Future **6 Periods**

Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism (CDM).

TEXT BOOKS

1. R.Rajagopalan, **"Environmental studies From crisis to cure"**, Oxford University Press, 2nd Edition, 2005.
2. Anubha Kaushik, C.P.Kaushik, **"Environmental studies",** New age International Publishers, 4th Edition,2012.

REFERENCES

1. Erach Bharucha, **"Environmental Studies",** University Grants Commission, and University Press,1st Edition, 2005.
2. M.Anji Reddy, **"Text book of Environmental Science and Technology",** 3rd Edition, 2007.
3. Richard T.Wright, **"Environmental Science: Towards A Sustainable Future",** PHI Learning Pvt Ltd., New Delhi, 2nd Edition, 2008.
4. Gilbert McMasters and Wendell P.Ela, **"Environmental Engineering and Science",** 3rd Edition, PHI Learning Pvt. Ltd., 2008.

E-RESOURCES

1. http://www.gdrc.org/uem/ait-terms.html (Glossary of Environmental terms).
2. http://www.environmentalscience.org/ (Environmental sciences Lectures series).
3. Journal of earth science and climatic change (OMICS International Journal).
4. Journal of pollution effects & control (OMICS International Journal).
5. nptel.ac.in/courses/120108004/ (Principles of Environment Management Lectures).
6. http://www.nptelvideos.in/2012/12/fundamentals-of-environmental-pollution.html (NPTEL online video courses IIT lectures).

Course Outcomes

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

1. Realize the importance of ecosystem, its structure, services and make aware of different natural functions of ecosystem, which helps to sustain the life on the earth.
2. Use natural resources more efficiently.
3. Make aware of the impacts of human actions on the environment, its effects and minimizing measures to mitigate them.
4. Educate regarding environmental issues and problems at local, national and international level.
5. Know more sustainable way of living.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70211	CONTROL SYSTEMS (Common for EEE and ECE)	L	T	P
Credits: 3		2	2	-

Prerequisites: Engineering Mathematics.

Course Objectives: This course introduces different ways of system representations such as Transfer function representation and state space representations and to assess the system dynamic response. It also emphasis on analysis of system performance in time and frequency domain and techniques for improving the performance.

MODULE I: Introduction **10 Periods**

Concepts of Control Systems - Open Loop and closed loop control systems and their differences - Different examples of control systems - Classification of control systems, Feedback 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.

Synchros, AC & DC servo motors and stepper motor.

MODULE II: Time Response Analysis **10 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 **10 Periods**

A: The concept of stability – Routh's stability criterion – Qualitative stability and conditional stability – Limitations of Routh's stability.

B: 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 **9 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 **9 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.
2. Benjamin.C.Kuo, **"Automatic Control Systems"**, Prentice Hall of India, 7th Edition, 1995.

REFERENCES

1. A.Nagoor kani, "**Control Systems**", RBA Publications, 2nd Edition, 2006.
2. M.Gopal, **"Control System: Principles and Design"**, Tata McGraw Hill, 2 nd Edition, 2002.

3. Joseph J Distefano, "**Schaum's Outline Series of Feedback and Control Systems",** Tata McGraw Hill, 2nd Edition, 2014.
4. K. Ogata, **"Modern Control Engineering"**, Pearson Education, New Delhi, 5th Edition, 2010.
5. M. Gopal, **"Control Systems, Principles & Design"**, Tata McGraw Hill, 4th Edition,2012.

E - RESOURCES

1. https://www.electrical4u.com/control-engineering-historical-review-and-types-of-control-engineering/
2. http://ieeecss.org/CSM/library/2011.html
3. http://nptel.ac.in/courses/108101037/

Course Outcomes

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

1. Apply transfer function models to analyze physical systems.
2. Determine the transient and steady state behavior of systems subjected to standard test signals.
3. Analyze the linear systems for absolute and relative stability in time and frequency domain.
4. Analyze the stability of the linear system in frequency domain and design compensators.
5. Familiarize with state space analysis and system properties like Controllability and Observability.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70212	POWER SYSTEM ANALYSIS	L	T	P
Credits: 3		3	-	-

Prerequisites: Computational Mathematics, DC Machines and Transformers, AC Machines, Power Transmission Systems.

Course Objectives:

To expose the students about the modeling of power system under steady state condition and apply numerical methods to solve the load flow problems. It deals about the modeling and analyze of power system under fault condition. It also emphasis on steady state stability of the system.

MODULE I: Introduction **9 Periods**

Need for system planning and operational studies – basic components of a power system.- Introduction to restructuring - Single line diagram – per phase and per unit analysis – Generator - transformer – transmission line and load representation for different power system studies - Primitive network - construction of Y-bus using inspection and singular transformation methods.

MODULE II: Power Flow Analysis **10 Periods**

Importance of power flow analysis in planning and operation of power systems - statement of power flow problem - classification of buses - development of power flow model in complex variables form – Load flow solutions using Gauss Seidal Method: Acceleration factor, Load flow Solution with and without PV buses – Algorithm and Flowchart – Numerical problems (Max. 3 Buses).

Load flow solution using Newton-Raphson method in Polar Co-ordinate form – Algorithm and flowchart. Load flow solution using Fast Decoupled method - Algorithm and flowchart. Comparison of Different Methods.

MODULE III: Balanced Fault Analysis **10 Periods**

A: Importance of short circuit analysis - assumptions in fault analysis - analysis using Thevenin's theorem - Z-bus building algorithm - fault analysis using Z-bus.

B: Balanced fault analysis under no load and loaded conditions - Computations of short circuit capacity, post fault voltage and currents.

MODULE IV: Unbalanced Fault Analysis **10 Periods**

Introduction to symmetrical components – sequence impedances – sequence circuits of synchronous machine, transformer and transmission lines - sequence networks analysis of single line to ground, line to line and double line to ground faults using Thevenin's theorem and Z-bus matrix.

MODULE V: Stability Analysis **9 Periods**

Importance of stability analysis in power system planning and operation - classification of power system stability - angle and voltage stability.

Single Machine Infinite Bus (SMIB) system: Development of swing equation - equal area criterion - determination of critical clearing angle and time – solution of swing equation by modified Euler method and Runge-Kutta fourth order method.

TEXT BOOKS

1. C.L.Wadhwa, **"Electrical Power Systems"**, New Age International (P) Limited, Publishers, 4th Edition, 2005.
2. I.J.Nagrath and D.P.Kothari, **"Modern Power System Analysis"**, Tata McGraw-Hill Publishing Company, 4th Edition, Reprint 2005.

REFERENCES

1. William Stagg, **"Computer Methods in Power Systems",** McGraw-Hill, 1968.
2. Pai, M. A., and Dheeman Chatterjee, **"Computer Techniques in Power System Analysis"** McGraw-Hill Education (India), 2014.
3. Grainger, John J., and William D. Stevenson, **"Power System Analysis"**, McGraw-Hill, 1994.
4. A.R.Bergen, **"Power System Analysis"**, Prentice Hall Inc., 3rd Edition, Reprint 2004.
5. Hadi Saadat, **"Power System Analysis"**, PSA Publishing, 3rd Edition, 2010.

E - RESOURCES

1. https://sites.google.com/site/pradeeppsanotes2017/
2. http://nptel.ac.in/courses/108105067/
3. http://nptel.ac.in/courses/108105066/

Course Outcomes

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

1. Model power systems under steady state condition and form power system network matrices.
2. Understand the load flow studies.
3. Analyze the power system under balanced fault condition.
4. Analyze the power system under unbalanced fault condition.
5. Analyze the stability of the power system.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70213	AC MACHINES	L	T	P
Credits: 3		3	-	-

Prerequisites: Electromagnetic Fields

Course Objectives:

This course facilitates to study the performance of induction motors which is main drive for industrial applications. It also emphasis about the performance analysis of synchronous machines.

MODULE I: Three Phase Induction Motors **10 Periods**

Three 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 **10 Periods**

Rotor power input, Rotor copper loss and mechanical power developed and their inter relation - 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 III: Single Phase Induction Motors **9 Periods**

A: Single phase induction motors – Principle of operation - Double revolving field theory - Split phase induction motor - Capacitor start induction motor - Capacitor start and run induction motor.

B: Equivalent circuit - Shaded pole induction motor - Universal motor – Repulsion induction motor- Numerical Problems.

MODULE IV: Synchronous Generators **10 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 V: Synchronous Motors **9 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. P.S. Bimbra, **"Electrical Machinery"**, Khanna Publishers, New Delhi, 7th Edition, 2011.
2. J.B.Gupta, **"Theory & Performance of Electrical Machines"**, S.K. Kataria & Sons, 15th Edition, 2015.

REFERENCES

1. M.G Say, **"Performance and Design of A.C Machines"**, 3rd Edition, BPB Publishers, 2002.
2. A.E.Fitzgerald, C.Kingsley and S.Umans, **"Electric Machinery"**, Tata McGraw-Hill Companies, 7th Edition, 2013.

3. I.J.Nagrath & D.P.Kothari, **"Electric Machines"**, Tata McGraw Hill, 4th Edition, 2010.
4. S. Kamakashaiah, **"Electromechanics-II (Transformers and Induction Motors)"**, Hitech Publishers.
5. R.K.Rajput, **"Electrical Machines"**, Laxmi Publications Pvt., Ltd., New Delhi, 4th Edition, 2006.

E - RESOURCES

1. https://www.electrical4u.com/induction-motor-types-of-induction-motor/
2. https://www.electrical4u.com/synchronous-motor-working-principle/
3. https://www.eeweb.com/electromechanical
4. http://nptel.ac.in/courses/108106072/

Course Outcomes

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

1. Impart knowledge on Poly Phase Induction Motors.
2. Analyze the performance of Induction Motors.
3. Understand the construction and operation of single phase Induction Motors.
4. Analyze the performance of Synchronous Generator.
5. Analyze the performance of Synchronous Motor.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70214	POWER ELECTRONICS	L	T	P
Credits: 3		3	-	-

Prerequisites: Electrical Circuit Analysis and Synthesis, Electronic Circuits -I.

Course Objectives: This course deals about the structure, operation and characteristics of power semiconductor devices. It also emphasis on the operation, characteristics and performance parameters of single phase controlled converters, three phase controlled converters, AC voltage controllers, choppers and Inverters.

MODULE I: Power Semiconductor Devices **9 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 **10 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: Midpoint 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**

A: Three phase three pulse converters – Mid Point and Bridge connections – Average load voltage with R and RL loads – Numerical Problems.

B: Three phase 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 & Cyclo Converter **10 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 midpoint 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 & Inverters **9 Periods**

Choppers: 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 Problems.

Three Phase Inverters: Analysis of 180 degree and 120 degree modes of operation with resistive, inductive loads - Numerical Problems.

TEXT BOOKS

1. M.H. Rashid, **"Power Electronics: Circuits, Devices and Applications"**, 3rd Edition, Pearson Education, New Delhi, 2014.
2. P.S. Bimbra, **"Power Electronics"**, 5th Edition, Khanna Publishers, New Delhi, 2012.

REFERENCES

1. A.Chakrabarti, **"Fundamentals of Power Electronics and Drives"**, Dhanpat Rai & Co, 2008.
2. S R Doradla, A Joshi, RMK Sinha and G K Dubey, **"Thyristorised Power Controllers"**, New Age International (P) Ltd., 2012.
3. Ned Mohan, Tore M. Undeland and William P. Robbins, **"Power Electronics: Converters, Applications and Design"**, John Wiley and Sons, 2nd Edition, 2007.
4. M.D. Singh, K.B.Khanchandani, **"Power Electronics"**, 2nd Edition, Tata McGraw Hill, New Delhi, 2008.
5. L. Umanand, **"Power Electronics Essentials and Applications"**, Wiley, 2010.

E - RESOURCES

1. http://nptel.ac.in/courses/108105066/
2. https://www.elprocus.com/power-electronics-project-ideas/
3. https://www.eeweb.com/analog-design
4. http://nptel.ac.in/courses/108101038/

Course Outcomes

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

1. Describe the structure, operation and characteristics of power semi conductor devices.
2. Understand the operation, characteristics and performance parameters of single phase controlled converters.
3. Analyze three phase power converter circuits and understand their applications.
4. Analyze single phase AC voltage controllers and Cyclo Converters and their applications.
5. Understand the operation, characteristics and performance parameters of choppers and inverters.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70414	LINEAR & DIGITAL INTEGRATED CIRCUIT APPLICATIONS (Common for EEE and ECE)	L	T	P
Credits: 3		3	-	-

Prerequisites: Switching Theory & Logic Design, Pulse & Digital Circuits.

Course Objectives:

This course introduces the basic op-amp IC741 and study various linear and non-linear applications of op-amps. This also introduces the types of filters, timers and PLLs and their implementation and also how to design regulators, converters and combinational logic circuits.

MODULE I: Integrated Circuits & Operational Amplifier **8 Periods**

Introduction, Classification of IC's, IC chip size and circuit complexity, basic information 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 **10 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 Phase Locked Loops (PLL) **10 Periods**

A: Filters: Introduction, Butterworth filters – 1st order, 2nd order low pass and high pass filters, band pass, band reject and all pass filters.

B: Timer and Phase Locked Loops(PLL): Introduction to IC 555 timer, description of functional diagram, monostable and astable operations 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 **10 Periods**

Voltage Regulator: Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, Switching Regulator.

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 **10 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).

Sequential Circuits Using TTL 74XX ICS: Flip Flops (IC 7474, IC 7473), Shift Registers, Universal Shift Register(IC 74194), 4- bit asynchronous 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.
2. Ramakant A. Gayakwad, **"OP-AMP and Linear Integrated Circuits"**, Prentice Hall / Pearson Education, New Delhi, 4th edition, 2012.

3. Floyd, Jain, **"Digital Fundamentals, Pearson Education"**, New Delhi, 8th edition, 2009.

REFERENCES

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.

E-RESOURCES

1. http://fmcet.in/ECE/EC6404_uw.pdf
2. https://www.iare.ac.in/sites/default/files/lecture_notes/LDIC%20Lecture%20Notes.pdf.
3. http://smec.ac.in/sites/default/files/lecture_notes/Course%20File%20of%20LDIC(Linear%20and%20Digital%20IC%20Applications).pdf
4. http://crectirupati.com/sites/default/files/lecture_notes/LDICA%20Lecture%20notes%20by%20A.Mounika.pdf
5. http://www.springer.com/engineering/electronics/journal/10470.
6. https://www.journals.elsevier.com/microelectronics-journal
7. http://nptel.ac.in/courses/117107094/
8. https://www.youtube.com/watch?v=NVj_Eu3sJL4
9. http://freevideolectures.com/Course/2915/Linear-Integrated-Circuits

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

1. To understand the information of Operational Amplifier with its DC and AC characteristics.
2. Analyze the linear and non-linear applications, waveform generators and sinusoidal oscillators using Operational Amplifier.
3. Design of Butterworth filters using Operational Amplifiers, IC-555 Timers and PLL with theory and applications.
4. To understand the voltage regulators using Integrated Circuits, D/A and A/D Converters.
5. Analyze the CMOS logic and design of combinational and sequential circuits using the TTL 74xx ICs.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70421	DIGITAL SIGNAL PROCESSING (Common for EEE and ECE) (Professional Elective – I)	L	T	P
Credits: 3		2	2	-

Prerequisites: Signals & Systems.

Course Objective:
This course introduces the processing of Discrete time signals using various transforming techiniques and structures of IIR and FIR filters and also the concept of Multi-rate Digital signal Processing.

MODULE I: Discrete Time Signals, Systems andDiscrete Fourier Series 8 Periods
Discrete Time Signals, Systems: Discrete time signals & discrete time systems, Analysis of Discrete time Linear time invariant Systems, Discrete time systems described by difference equations. Convolution of Discrete Time Signals and sequences.
Discrete Fourier Series: DFS Representation of periodic sequences, Properties of Discrete Fourier Series,

MODULE II: Transforms 12 Periods
Discrete Fourier Transform (DFT): Discrete Fourier Transforms: Linear Convolution of sequences using DFT and Circular Convolution, Problems on DFT.
Discrete Time Fourier Transform (DTFT): Definition, Frequency Response of an LTI system, Interconnection of LTI systems (Parallel and Cascade).
Fast Fourier Transforms (FFT): Definition, Radix-2 decimation in time and decimation in frequency FFT Algorithms and Inverse FFT.

MODULE III: IIR Digital Filters 10 Periods
A: Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance
B: Bilinear transformation- LPF, HPF, BPF, BRF filters design using frequency translation, Realization of IIR filters.

MODULE IV: FIR Digital Filters 9 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, Realization of FIR filters

MODULE V: DSP Applications and Processors 9 Periods
Multirate Digital Signal Processing: Decimation, Interpolation, Sampling rate conversion by a rational Factor.
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.
2. A.Nagoorkani, **"Digital signal processing"**, Tata McGraw Hill, 2ndEdition, 2012.
3. Avtar Singh and S. Srinivasan, **Digital Signal Processing Implementations Using DSP Microprocessors – with Examples from TMS320C54xx**, CENGAGE Learning, India, 1st Edition, 2008.

REFERENCES

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.

E-RESOURCES

1. https://archive.org/details/DIGITALSIGNALPROCESSING.
2. http://freevideolectures.com/Course/2339/Digital-Signal-Processing-IITKharagpur
3. https://www.journals.elsevier.com/digital-signal-processing/
4. https://www.journals.elsevier.com/signal-processing/
5. https://www.youtube.com/watch?v=6dFnpz_AEyA
6. https://www.youtube.com/watch?v=6dFnpz_AEyA
7. http://nptel.ac.in/courses/117102060/

Course Outcomes

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

1. Understand the nature of discrete time signals and DFS computation
2. Understand DTFT, DFT and the fast computation of DFT using FFT algorithms and implement in real-time applications.
3. Design IIR Digital filters for the given specifications.
4. Design FIR Digital filters for the given specifications.
5. Design Real time systems using the multirate processing techniques and the DSP processors.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70223	PROGRAMMABLE LOGIC CONTROLLERS AND THEIR APPLICATIONS (Professional Elective-I)	L	T	P
Credits: 3		2	2	-

Prerequisites: Nil

Course Objectives: To impart knowledge on Mode of operation and programming of a Programmable Logic Controller (PLC), to impart knowledge on Characteristics of a PLC (synchronous, asynchronous), Analysis of the process schematic, analog PLC and PID controllers.

MODULE I: Introduction To PLC **9 Periods**

PLC Basics PLC system, I/O modules and interfacing CPU processor programming equipment programming formats, construction of PLC ladder diagrams, devices connected to I/O modules.

MODULE II: Plc Programming **10 Periods**

PLC programming input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill press operation. Digital logical gates programming in the Boolean algebra SYSTEM, CONVERSION EXAMPLES-Ladder diagrams for process control – Ladder diagrams for sequence listings – ladder diagram construction and flow chart for spray process system.

MODULE III: Registers And Counters **10 Periods**

A: PLC Registers: Characteristics of registers – module addressing – holding registers – output registers – PLC functions – Timer functions and industrial application.

B: counters – counter function industrial application – Architecture functions – number function comparison functions.- number conversion functions.

MODULE IV: Data Handling Fucntions And Sequence Functions **10 Periods**

Data handling functions: SKIP, Master control relay – Jump Move FIFO, FAL, ONS, CLR and sweep functions and their applications.

Bit pattern and changing a bit shift register, sequence functions and applications – controlling of two axes and three axis Robots with PLC, Matrix functions.

MODULE V: Analog PLC **9 Periods**

Analog PLC operation: Analog modules and systems – Analog signal processing, multi-bit data processing, analog output application examples, PID principles, position indicator with PID control, PID modules, PID tuning, PID functions.

TEXT BOOKS

1. W. Bolton, **"Programmable Logic Controllers"** , 5th Edition, Elsevier, 2009.
2. J R Hackworth and F D Hackworth Jr, "**Programmable Logic Controllers – Programming methods and Applications"** 5th Edition,Pearson Publications, 2004.

REFERENCES

1. John W Webb and Ronald A Reiss, **"Programmable Logic Controllers – Principles and Applications"**, 5th Edition, Prentice Hall of India, 1998.
2. Rajesh Mehra and Vikrant Vij, **"PLCs & SCADA: Theory and Practice", 1st Edition,** Laxmi Publications, 2016.

E RESOURCES

1. https://www.amci.com/industrial-automation-resources/plc-automation-tutorials/what-plc/
2. http://library.automationdirect.com/understanding-ladder-logic/
3. nptel.ac.in/courses/112102011/11

Course Outcomes

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

1. Understand the basic concepts of PLC and construct the PLC ladder diagrams.
2. Programming the PLC and Analyze the process schematic.
3. Understand the characteristics of PLC registers and Architecture functions.
4. Analyze the data handling functions and sequence functions.
5. Understand the Analog PLC operation & analog signal processing.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70547	COMPUTER ORGANIZATION AND OPERATING SYSTEMS (Professional Elective-I)	L	T	P
Credits: 3		2	2	-

Prerequisites: Nil

Course Objectives:

This course will make students to understand the basic structure and operation of digital computer, study the micro programmed control, I/O organizations and serial communication of peripheral devices and study the overview of operating systems & memory management components, demonstrate the knowledge of functions of management scheduling, file system and interfaces, security and deadlocks.

Module I: **10 Periods**

Basic Structure of Computers: 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: **8 Periods**

Micro Programmed Control: Control Memory, Address Sequencing, Micro program Examples, Design of Control Unit, Hard Wired Control, Micro programmed 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:

A: Input-Output Organization **10 Periods**

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Priority Interrupt, Direct Memory Access, Input –Output Processor (IOP)

B: Serial Communication

Serial Communication; Introduction to Peripheral Components, Interconnect (PCI) Bus, Introduction to Standard Serial Communication Protocols like RS232, USB, IEEE1394.

Module IV: **10 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: **10 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
2. M.Moris Mano, **"Computer Systems Architecture**",Pearson Education,3rd Edition
3. Abraham Silberchatz,Peter B. Galvin, Greg Gagne, **"Operating System Principles"** 8th Edition, John Wiley.

REFERENCE BOOKS:

1. William Stallings, "**Computer Organization and Architecture**", Pearson Education,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",** Pearson/PHI, 2nd edition
6. B.L.Stuart, "**Principles of Operating Systems**", Cengage Learning, India Edition

E-RESOURCES:

1. https://www.scribd.com/doc/129430301/Hamacher-Computer-Organization-5th-Ed
2. https://archive.org/details/2005OperatingSystemConcepts7thEditionAbrahamSilberschatz
3. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7Eh9eBOsT1ELoYpKlg_xngrkluevXOJL-s1TbxS8q2icgUs3hL4_KAi5So5FgXcVg
4. http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwH9xY7xAYUzYSlXl4znudlsolre7wQNrNXLxbgGFxbkoyx1iN3YbHuFrzI2jc_70rWMEwQ
5. http://nptel.ac.in/courses/106106092/
6. http://nptel.ac.in/courses/106108101/

Course Outcomes:

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

1. Develop the structure of digital computer Arithmetic operations of binary number system.
2. Classify the micro programmed control and memory operations
3. Design input & output organization serial communication
4. Understand the operating systems overview and memory management techniques impact of instruction set architecture of computer design.
5. Examine various file systems interfaces and implementation

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70215	AC MACHINES LAB	L	T	P
Credits: 2		-	-	4

Course Objectives: This course deals with the practical aspects of various ac machines like transformer, induction motor and synchronous machines.

List of Experiments:

1. OC & SC 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. Load test of a three-phase alternator.

Course Outcomes

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

1. Assess the performance of single phase transformer using various methods.
2. Assess the performance of single phase induction motor.
3. Determine the regulation of alternator using different methods
4. Determine the performance of 3 phase induction motor by various methods.
5. Assess the performance of synchronous machines.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70413	**PULSE & DIGITAL CIRCUITS LAB** (Common for EEE and ECE)	**L**	**T**	**P**
Credits: 2		**-**	**-**	**4**

Course Objective:
To design linear, non-linear wave shaping circuits and multivibrators according to given specifications.

LIST OF EXPERIMENTS:
PART A:

1. Linear wave shaping.
2. Non Linear wave shaping - Clippers
3. Non Linear wave shaping - Clampers.
4. Transistor as a switch.
5. Realization of Logic Gates using Discrete components .
6. Study of flipflops and 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 Laboratories:

1. Regulated Power Supply - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. Components
5. Multi Meters

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

1. Understand the different Pulse Circuits
2. Understand and Design the Logic Gates
3. Design and Use the Multivibrators for different Applications
4. Design Oscillator Circuit
5. Understand the Concepts of Digital Circuits

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70216	CONTROL SYSTEMS LAB	L	T	P
Credits: 2		-	-	4

Course Objectives: This course will give the basic knowledge on practical control system and PLC applications. It emphasizes the knowledge on applications of machines & electronic devices with control systems.

List of Experiments:

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. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using MATLAB.
12. State space model for classical transfer function using MATLAB.

Course Outcomes

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

1. Formulate transfer function for given control system problems.
2. Ability to find time response of given control system model.
3. Plot Root Locus and Bode plots for given control system model by using MATLAB.
4. Ability to design Lead, Lag, Lead-Lag systems in control systems.
5. Ability to design PID controllers for given control system model.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code:70M04	PROFESSIONAL ETHICS (Common for CE, EEE, ME,ECE, CSE, IT and Min.E)	L	T	P
Credits: Nil		-	2	-

Prerequisites: Nil

Course Objectives

The objective is to make students familiar with professional ethics. It moulds the student to be trustworthy and honest with more professional responsibilities.

MODULE I: Understanding Ethics **6 Periods**

Ethics- Definition- Ethical Vision- Engineering Ethics- Approaches to Ethical Behavior- Various Connotations of Engineering Ethics- Solving Ethical Conflicts- Ethical Judgment

Ethical Theories- Consensus and Controversy- Models of Professional Roles- Theories about Right Action.

MODULE II: Engineering Ethics **6 Periods**

Engineering ethics: Sense of Engineering Ethics- Variety of Moral Issued- Types of Inquiry- Moral Dilemmas- Moral Autonomy- Kohlberg's Theory- Gilligan's Theory.

Code of Ethics- Code of Ethics for engineer, Sample Codes- IEEE, ASME, ASCE and CSI, Personal ethics Vs. Professional ethics.

MODULE III: Engineer's Responsibilities and Rights **6 Periods**

A: Collegiality and Loyalty- Respect for Authority- Professional Rights- Sexual Harassment at Workplace.

B: Conflicts of Interest- Confidentiality- Collective Bargaining- Role of Engineers in Promoting Ethical Climate and balanced Outlook on Law- Ethical Audit.

MODULE IV: Engineer's Responsibility for Safety and Risk **8 Periods**

Safety and Risk- Types of Risk- Moral Responsibility of Engineers for Safety- Risk Benefit Analysis.

Case Study- Bhopal Gas Tragedy- Chernobyl Disaster- Fukushima Nuclear Disaster.

MODULE V: Global Issues and roles of engineers **6 Periods**

Multinational corporations, Environmental ethics, Computer ethics, Weapons development.

Engineers as managers, Engineers as expert witnesses and advisors, engineers as responsible experimenters.

TEXTBOOKS:

1. Govindarajan M, Natarajan S, Senthil Kumar V. S, **"Engineering Ethics",** Prentice Hall of India, New Delhi,
2. S.B.Gogate**,"Human Values & Professional Ethics**",Vikas Publishing House Pvt., Ltd., First edition-2011

REFERENCES BOOKS:

1. Charles D. Fleddermann, **"Engineering Ethics",** Pearson Education / Prentice Hall,
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, **"Engineering Ethics – Concepts and Cases"**, Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available) 2003.
3. C.G.Krishnadas Nair, **"Engineering Ethics",** Harishree Publishing Company, Bangalore.
4. R.K.Shukla, Anuranjan Mishra**,"Human Values and Professional Ethics"** Published by A.B.Publication.

E-RESOURCES:

1. https://www.slideshare.net/lizakhanam/business-ethics-and-corporate-governance-15588903
2. http://www.enterweb.org/ethics.htm
3. http://nptel.ac.in/courses/110105079/
4. http://nptel.ac.in/courses/109104032/

Course Outcomes:

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

1. Understand the basics of ethics and ethical theories.
2. Understand the engineering ethics and code of ethics.
3. Learn the issues related to the engineer's responsibilities and rights.
4. Understand Engineer's Responsibility for Safety and Risk
5. Understand the global issues in ethical point of view and their role in globalization era.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. V Semester		
Code: 70A05	**INTERNSHIP-II** (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	**L**	**T**	**P**
Credits: Nil		**-**	**-**	**-**

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech VI Semester		
Code:70H04	ENGINEERING ECONOMICS AND ACCOUNTANCY (Common for CE,EEE,ME,ECE,CSE and IT)	L	T	P
Credits: 2		2	-	-

Prerequisites: Nil

Course Objectives:
EEA 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: Business Environment and Managerial Economics 8 Periods

Business Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Latest trends in Business Environment (Entrepreneurship).

Managerial Economics: Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand, Types, Significance of Elasticity of Demand, Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

MODULE II: Theory of Production and Cost Analysis 6 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 6 Periods

A. **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.
B. **Pricing Policies & Methods:** Cost plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, PLC based pricing methods.

MODULE IV: Capital and Capital Budgeting 6 Periods

Capital: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.

Capital Budgeting : 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 6 Periods

Financial Accounting: Introduction, Accounting principles, Accounting Cycle, 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.
2. Varshney & Maheswari, **"Managerial Economics"**, 5th edition Sultan Chand, 2003.

REFERENCES

1. H. Craig Peterson & W. Cris Lewis, **"Managerial Economics"**, PHI, 4 Ed.
2. Domnick Salvatore, **"Managerial Economics In a Global Economy"**, Thomson, 4th Edition.
3. Raghunatha Reddy & Narasimhachary, **"Managerial Economics& Financial Analysis"**, 4TH edition Scitech.
4. S.N.Maheswari & S.K. Maheswari, **"Financial Accounting"**, 6th edition Vikas.
5. Dwivedi, **"Managerial Economics"**, Vikas, 6th Edition.

E RESOURCES

1. http://www.learnerstv.com/Free-Economics-video-lecture-courses.htm
2. http://www.onlinevideolecture.com/?course=mba-programs&subject=microeconomics
3. http://www.learnerstv.com/Free-Management-Video-lectures-ltv034-Page1.htm
4. http://www.learnerstv.com/Free-Management-Video-lectures-ltv637-Page1.htm
5. http://www.onlinevideolecture.com/?course=mba-programs&subject
6. http://nptel.ac.in/courses/110105067/
7. http://nptel.ac.in/courses/110107073/
8. http://nptel.ac.in/courses/110101005/
9. http://nptel.ac.in/courses/109104073/

Course outcomes:

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

1. Understand the concepts of managerial economics and their application in evaluating the demand.
2. Evaluate the production function and identifies the least cost combination to control the costs of production.
3. Understand the structures of various market types and their pricing policies.
4. Understand the types of business forms and also be able to evaluate the investments using capital budgeting techniques.
5. Understand the basic concepts of financial accounting and evaluation of company performance using ratio analysis.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70448	MICROPROCESSORS AND MICROCONTROLLERS (Common for EEE and CSE)	L	T	P
Credits: 3		2	2	-

Prerequisites: Computer Organization, STLD/DLD

Course Objectives:
To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques.

MODULE I: 8086 Architecture **10 periods**

8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Signal descriptions of 8086- Common Function Signals, Timing diagrams, Interrupt Structure of 8086, Vector Interrupt Table, Interrupt Service Routine.

MODULE II: Instruction Set and Assembly Language Programming of 8086 **10 periods**
Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String Manipulations.

MODULE III: I/O Interface and Communication Interface **10 periods**
A: I/O Interface: 8255 PPI, Various Modes of Operation and Interfacing to 8086, Memory Interfacing to 8086, Interfacing Keyboard and Display, Interfacing D/A and A/D Converter.
B: Communication Interface: Serial Communication Standards, Serial Data Transfer Schemes, 8251 USART Architecture and Interfacing.

MODULE IV: Introduction to Microcontrollers **8 periods**
Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

MODULE V: Interfacing Microcontroller **10 periods**
Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

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. A. K. Ray and K.M. Bhurchandani, **"Advanced Microprocessors and Peripherals"**, TMH, 2nd Edition 2006.
2. K.Uma Rao, Andhe Pallavi, **"The 8051Microcontrollers, Architecture and Programming and Applications"** , Pearson, 2009.
3. Liu and GA Gibson, **"Micro Computer System 8086/8088 Family Architecture, Programming and Design"**, PHI, 2nd Edition.
4. Ajay. V. Deshmukh, **"Microcontrollers and Application"** , TMGH, 2005.
5. K.Uday Kumar, B.S.Umashankar, **"The 8085 Microprocessor: Architecture, programming and Interfacing"** , 2008, Pearson.

E-RESOURCES

1. http://www.cpu-world.com/CPUs/8086/
2. https://www.slideshare.net/akhilsingal92/8086-pin-diagram-description
3. http://www.gabrielececchetti.it/Teaching/CalcolatoriElettronici/Docs/i8086_instruction_set.pdf
4. https://www.slideshare.net/akshansh2593/microprocessor-and-interfacing-notes
5. https://www.journals.elsevier.com/microprocessors-and-microsystems/
6. http://rtcmagazine.com/technologies/view/Microcontrollers
7. https://www.researchgate.net/journal/0141-9331_Microprocessors_and_Microsystems
8. http://nptel.ac.in/courses/106108100/
9. http://nptel.ac.in/courses/108107029/

Course Outcomes:

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

1. Understand the internal organization of popular 8086 Microprocessor.
2. Write and execute the software programs.
3. Design microprocessor based system by interfacing peripheral devices.
4. Understand the concepts of 8051 Microcontroller.
5. Control the real time applications using 8051 Microcontroller

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70217	SWITCHGEAR AND PROTECTION	L	T	P
Credits: 3		2	2	-

Prerequisites: DC Machines and Transformers, AC Machines, Power System Analysis, Power Generation and Distribution.

Course Objectives:

This course deals with different kinds of circuit breakers and relays for protection of generators, transformers and feeder bus bars from over voltages and other hazards. It also emphasis on Neutral grounding for overall protection.

MODULE I: Circuit Breakers **10 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-Construction and Operation of Minimum Oil Circuit breakers, Air Blast Circuit Breakers, Vacuum and SF6 circuit breakers-Numerical problems.

MODULE II: Relays **10 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 versus Electromagnetic Relays.

MODULE III: System Protection **10 Periods**

A: Protection of Generators: Stator fault protection, Rotor fault protection, Restricted Earth fault and Inter-turn fault Protection, Numerical Problems on % Winding Unprotected.

Protection of Transformers: Percentage Differential Protection, Numerical Problems on Design of CT Ratio, Buchholtz relay Protection.

B: Protection of Feeders: Over Current, Carrier Current and Three-zone distance relay protection using Impedance relay, Translay Relay.

Protection of Bus bars: Differential protection.

MODULE IV: Neutral Grounding **9 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: Protection Against Over Voltages **9 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. Sunil S. Rao, **"Switchgear and Protection and Power System"**, 13th Edition, Khanna Publishers, New Delhi, 2008.
2. Soni, M.L., Gupta, P.V., Bhatnagar, U.S. and Chakrabarti, **"A Text Book on Power Systems Engineering"**, Dhanpat Rai & Sons Company Limited, New Delhi, 2nd Edition, 2003.

REFERENCES

1. Badari Ram, D.N Viswakarma, **"Power System Protection and Switchgear**" Tata McGraw Hill, 2nd Edition, 2010.
2. C.L.Wadhwa, **"Electrical Power Systems"**, New Age international (P) Limited, 4th edition, 2006.
3. Paithankar and S.R.Bhide , **"Fundamentals of Power System Protection"**, Prentice Hall of India, 2nd Edition 2003.
4. B. Ravindranath, and M. Chander, **"Power System Protection & Switchgear"**, 2nd Edition, New Age International, 2005.
5. S. L. Uppal, **"Electrical Power"**, 13th Edition, Khanna Publishers, New Delhi, 2006.

E - RESOURCES

1. https://www.electrical4u.com/electrical-switchgear-protection/
2. http://www.electricity-today.com/
3. http://nptel.ac.in/downloads/108101039/

Course Outcomes

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

1. Analyze the operation of various types of circuit breakers.
2. Identify Characteristics of Relay for specific applications of protection
3. Design the feasible protection systems for generators, transformers, feeders and bus bars.
4. Emphasis on Grounding practices in real time.
5. Investigate the fundamentals of protection against over voltages.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70218	POWER SYSTEM OPERATION AND CONTROL	L	T	P
Credits: 3		2	2	-

Prerequisites: Power System Generation and Distribution, Power System Analysis.

Course Objectives: This course 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: Economic Operation of Power Systems **10 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 **10 Periods**

A: Modeling of Governor, Turbine and Generators with corresponding block diagram representation and transfer function.

B: 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 **9 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 two area system – Uncontrolled case and controlled case – Tie - Line bias control.

MODULE V: Reactive Power Control **9 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 and Sunita Halder, **"Power System Analysis Operation and Control"**, PHI Learning Pvt. Ltd., 3rd Edition, 2010.
2. I.J.Nagrath and D.P.Kothari, **"Modern Power System Analysis"**, Tata McGraw Hill Publishing Company Ltd, 4th Edition, 2011.

REFERENCES

1. C.L.Wadhwa, **"Electrical Power Systems"**, New Age International (P) Limited, Publishers, 4th Edition, 2005.
2. T.J.E. Miller, "**Reactive Power Control in Electric Systems"**, John Wiley & Sons, New York, 1982.
3. J.Duncan Glover, M.S.Sarma and Thomas J.Overbye, "**Power System Analysis and Design",** Global Engineering Publisher, 5th Edition, 2012.
4. O.I.Elgerd, **"Electric Energy Systems Theory"**, Tata McGraw - Hill Education, 2nd Edition, 2003.
5. John J Grainger, William D Stevenson Jr, **"Power System Analysis"**, Tata McGraw – Hill Education, 2003.

E - RESOURCES

1. http://nptel.ac.in/courses/108101040/
2. https://www.eeweb.com/power-management
3. http://nptel.ac.in/courses/108104052

Course Outcomes

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

1. Compute the optimal scheduling of thermal power plants and allocation of affect of transmission line loss.
2. Compute the optimal scheduling of Hydro-thermal system.
3. Analyze the steady state behavior of the power system for voltage and frequency fluctuations.
4. Design suitable controller for the frequency and voltage steady state oscillations.
5. Describe reactive power control of a power system.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70224	ADVANCED CONTROL SYSTEMS (Professional Elective-II)	L	T	P
Credits: 4		3	2	-

Prerequisites: Control Systems.

Course Objectives: 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 10 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 10 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 9 Periods

A: Stability in the sense of Lyapunov, Lyapunov's stability and Lyapunov's instability theorems.
B: Direct method of Lyapunov for the Linear and Nonlinear continuous time autonomous systems.

MODULE IV: Modal Control & Calculus of Variations 10 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 9 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. M. Gopal, **"Modern Control System Theory"**, New Age International Publishers, 2nd Edition, 1996.
2. I.J.Nagarath and M.Gopal, **"Control Systems Engineering"**, New Age International Publishers, 5th Edition, 2007.

REFERENCES

1. K. Ogata, **"Modern Control Engineering"**, Prentice Hall of India, 3rd Edition, 1998.
2. M.Gopal, **"Digital Control and State Variable Methods"**, Tata McGraw-Hill Companies, 1997.
3. Stainslaw H. Zak, **"Systems and Control"**, Oxford Press, 2003.
4. Stanley M. Shiners, **"Modern Control System Theory and Design"**, John Wiley and Sons Publications, 2nd Edition, 1998.
5. Khalil H.D., **"Nonlinear Systems"**, Prentice Hall Publications, 3rd Edition, 2003.

E - RESOURCES

1. http://www.ieeecss-oll.org/
2. http://ieeecss.org/CSM/library/2011.html
3. http://nptel.ac.in/courses/108103007/

Course Outcomes

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

1. Analyze the system controllability and observability using state space representation.
2. Analyze the non linear systems using describing function method and phase plane analysis.
3. Analyze the concept of stability of nonlinear systems using Lyapunov's theorems.
4. Design pole-assignment controller and the specific design procedures for minimization and Euler Lagrange theorem.
5. Apply the knowledge of basic and modern control system for the real-time analysis and design the solution for optimal control problems.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70225	SPECIAL MACHINES (Professional Elective – II)	L	T	P
Credits: 4		3	2	-

Prerequisites: DC Machines and Transformers, AC Machines.

Course Objectives: The course deals with the special electrical machines such as induction generator, brushless DC machines, stepper motors which are used in different applications.

MODULE I: Induction Generators **10 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.

MODULE II: Brushless DC Machines **9 Periods**

Brushless DC Machines: Construction, operation, performance, control and applications.
Micro Machines: Principle of operation of various types. Sensors for control, e.g. Position sensor.

MODULE III: Linear Machines **10 Periods**

A: Linear Induction Machines and Linear Synchronous Machines. Construction, operation, performance, control and applications.
B: PMDC and PM Synchronous Machine, control and applications. Recent developments in electrical machines.

MODULE IV: Stepper Motors **10 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, operation, performance, control and applications.

MODULE V: Synchronous and Special Machines **9 Periods**

Construction of synchronous machines - Types - Induced emf - Voltage regulation - EMF and MMF methods. Brushless alternators - Reluctance motor - Hysteresis motor – Axial flux machine – Construction and working principle. Flux Reversal Machine – Construction and working principle - Applications.

TEXT BOOKS

1. P.C. Sen, "**Principles of Electrical Machines and Power Electronics"**, Wisley Edition, 2nd Edition, 1997.
2. Gopal K Dubey, **"Fundamentals of Electrical Drives",** Narosa Publications, 2nd Edition, 2008.

REFERENCES

1. Bimal K. Bose, **"Modern Power Electronics and AC Drives"**, Low Price Edition, 1st Edition, 2002.
2. R.K. Rajput, **"Electrical Machines"**, Laxmi Publications Pvt., Ltd, 5th Edition, 2005.
3. E.G. Janardanan, **"Special Electrical Machines"**, PHI Learning Pvt. Ltd., 2014.
4. K.Venkataratnam, **"Special Electrical Machines",** Universities Press, 1st Edition, 2008.

5. Simmi P. Burman, **"Special Electrical Machines"**, S.K. Kataria & Sons, 2013.

E - RESOURCES

1. http://nptel.ac.in/courses/108105063/pdf/L-32(SS)(IAC)%20((EE)NPTEL).pdf
2. https://www.eeweb.com/electromechanical
3. https://www.youtube.com/watch?v=Qy6mA4TEpyI

Course Outcomes

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

1. Understand the operation of induction generator.
2. Know the Construction and operating principle of Brushless DC motor and sensor used to control the speed of the motors.
3. Understands the Principle of operation of Linear Induction and Synchronous machines.
4. Comprehend the principle of operation of stepper motors, Permanent magnet motors and switched reluctance motors.
5. Understands the construction, operation and application of brushless alternators, reluctance motors, hysteresis motors and axial flux machines.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70226	ELECTRICAL DISTRIBUTION SYSTEMS AND AUTOMATION (Professional Elective – II)	L	T	P
Credits: 4		3	2	-

Prerequisites: Power Generation and Distribution

Course Objectives: To get awareness of distribution systems for load modeling. To be aware of the design and operation of substations. To be familiar with system protection and the coordination outcomes. To understand the concept of distribution automation.

MODULE I: General Concepts **9 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 II: Distribution Feeders and Substations **10 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 with 'n' primary feeders, benefits derived through optimal location of substations.

MODULE III: Distribution System Analysis **10 Periods**

A: Power Factor: Causes of low power factor - Methods of Improving power factor - Phase advancing and generation of reactive KVAR using static Capacitors - Most economical power factor for constant KW load and constant KVA type loads, Numerical Problems. Dependency of Voltage on Reactive Power flow.

B: 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 **10 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 Sectionalizes, and Circuit Breakers.

Coordination of Protective Devices: General coordination procedure Concepts of Smart grid and Demand Side Management.

MODULE V: Voltage Control & Distribution Automation **9 Periods**

Voltage Control: Methods of Voltage Control: Shunt Capacitors, Series Capacitors, Synchronous Capacitors, Tap changing and Booster Transformers, AVR/AVB, Line drop compensation.

Distribution Automation: Need for DA, Objectives & Functions of DA, SCADA, Consumer information service, GIS, Automatic meter reading.

TEXT BOOKS

1. Turan Gonen, **"Electric Power Distribution System Engineering"**, CRC Press, 2nd Edition, 2007.
2. A.S. Pabla **"Electric Power Distribution"**, Tata McGraw-Hill Publishing Company, 6th Edition, 1997.

REFERENCES

1. S.Sivanagaraju and V.Sankar, **"Electrical Power Distribution and Automation"**, Dhanpat Rai and Co., 2006.
2. V.Kamaraju, **"Electrical Power Distribution Systems"**, Tata McGraw-Hill Publishing Company, 2nd Edition, 2010.
3. G. RamMurthy, **"Electrical Power Distribution Hand Book"**, University press. 2nd Edition,
4. S. N. Singh, **"Electric Power Generation, Transmission and Distribution",** Prentice Hall of India, 2nd Edition, 2011.
5. James A. Momoh, **"Electric Power Distribution, Automation, Protection and Control"**, CRC Press, 2007.

E - RESOURCES

1. http://energycentral.fileburst.com/Sourcebooks/gsbk0106.pdf
2. https://www.journals.elsevier.com/international-journal-of-electrical-power-and-energ.
3. nptel.ac.in/courses/108102047/
4. https://www.youtube.com/watch?v=_iz8ZkjD7z8

Course Outcomes

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

1. Understand the important factors of electrical distribution systems and Classification of loads.
2. Understand the design and operation of feeders & substations.
3. Emphasis the concept of distribution system protection.
4. Analyze the voltage drop and power-loss calculations in electrical distribution systems.
5. Analyze the methods of voltage control and distribution automation.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code:	OPEN ELECTIVE - I	L	T	P
Credits: 4		3	2	-

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. VI Semester		
Code: 70H03	**ENGLISH COMMUNICATION AND PRESENTATION SKILLS LAB** (Common for CE,EEE,ME,ECE,CSE,IT and Min.E)	**L**	**T**	**P**
Credits: 1		-	-	**2**

Course Objectives:

The learners need to be aware of the characteristics of technical communication in their workplaces; as a result, they are exposed to different channels of technical communication. Hence the acquired skills make the learners effective communicators using persuasive language. Besides the above said, one of the major objectives is to maintain objectivity in writing documents and to produce professional quality documents using different components of the language.

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

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: 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 Module is purely for internal assessment/evaluation

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: 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.

REFERENCES

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.

E - RESOURCES

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

Course Outcomes:

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

1. Give Oral Presentations Confidently.
2. Draft appropriate Resume in accordance with the context.
3. Participate and present their view and ideas logically and confidently.
4. Understand the importance of communication in various settings.
5. Utilize the technology for career advancement.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70219	POWER ELECTRONICS LAB	L	T	P
Credits: 2		-	-	4

Course Objectives: Apply the concepts of power electronic converters for efficient conversion/control of power from source to load. Design the power converter with suitable switches meeting a specific load requirement.

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.

Course Outcomes

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

1. Analyze the AC voltage controller with R and RL Loads.
2. Analyze the different commutation circuits.
3. Understand the operating principles of various power electronic converters.
4. Use power electronic simulation packages& hardware to develop the power converters.
5. Analyze and choose the appropriate converters for various applications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70P01	TECHNICAL SEMINAR	L	T	P
Credits: 2		-	-	4

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VI Semester		
Code: 70A04	**MOOCs/NPTEL Certification Course** (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	**L**	**T**	**P**
Credits: Nil		**-**	**2**	**-**

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech. VII Semester		
Code:70H05	MANAGEMENT FUNDAMENTALS (Common for EEE, ECE, CSE and IT)	L	T	P
Credits: 2		2	-	-

Prerequisites: Nil

Course Objectives:
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 **6 Periods**
Introduction to Management: Concepts of Management and organization-nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management.
Management Theories: 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, Corporate Social responsibility.

MODULE II: Planning, Organization and types of Structures **8 Periods**
Planning: Need for planning- -Steps in the process of planning-Advantages and limitation of planning. Types of planning - Vision, Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Management by Objectives (MBO).
Organization and types of Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types of Organizations- Line organization, Line and staff organization, functional organization, committee organization, matrix organization, Virtual Organization, Cellular Organization, boundary less organization, inverted pyramid structure, lean and flat Organization structure.

MODULE III: Staffing and controlling **6 Periods**
A: Staffing: Basic concepts of HRM, functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development. Performance Appraisal, Job Evaluation and Merit Rating.
B: Controlling: process of controlling, types of controlling, managing productivity, Quality Control: chart, R chart, C chart, P chart, (simple Problems), Deming's contribution to quality.

MODULE IV: Operations and Materials Management **6 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.
Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.

MODULE V: Project Management and Contemporary Practices **6 Periods**
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)
Contemporary Management Practices: Basic concepts of ERP, Just-In-Time (JIT) System, Total Quality Management (TQM), six sigma and Capability Maturity Model (CMM) Levels, Bench marking, Balanced Score card.

TEXT BOOKS

1. Aryasri, **Management Science**, 4th edition TMH, 2004.
2. Stoner, Freeman, Gilbert, **Management,** Pearson Education, New Delhi, 6th Ed, 2004.

REFERENCES

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, 5th edition 2003.
4. Memoria & S.V. Gauker, **"Personnel Management"**, Himalaya, 25th edition, 2005
5. Samuel C. Certo, **"Modern Management"**, PHI, 9th edition, 2005.

E-RESOURCES:

1. http://freevideolectures.com/Course/2689/Management-Science
2. http://www.onlinevideolecture.com/?course=mba-programs&subject=human-resource-management
3. http://www.onlinevideolecture.com/?course=mba-programs&subject=marketing-fundamental
4. http://freevideolectures.com/Course/2371/Project-and-Production-Management
5. http://nptel.ac.in/courses/110105034/
6. https://www.youtube.com/watch?v=obzp6biyAN0
7. http://nptel.ac.in/courses/110104068/
8. http://nptel.ac.in/courses/110105069/

Course Outcomes:

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

1. Understand the various concepts, principles and theories of management.
2. Understand the basic concepts of planning and various structures of organizations.
3. Understand the process of staffing and controlling
4. Understand the process of operations management. Also learn the concepts of materials management and marketing management at an organization.
5. Understand the various contemporary management practices. Also the project management techniques.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70220	SOLID STATE DRIVES	L	T	P
Credits: 3		3	-	-

Prerequisites: DC Machines and Transformers, AC Machines and Power Electronics.

Course Objectives: To expose the students about the basic idea of electric drives and its characteristics by various power converter topologies. To familiar with the control of DC & AC motors with different techniques.

MODULE I: Electric Drives **9 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 wave forms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

MODULE III: Four Quadrant Operations of DC Drives **10 Periods**

A: 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.

B: Control of DC motors by Choppers:

Single quadrant, Two quadrant and four quadrant chopper fed D.C 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 **10 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 through Rotor & Synchronous Motors **9 Periods**

Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer drive – their performance and speed torque characteristics – advantages - applications – Problems.

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"**, Prentice Hall Inc., 2002.

REFERENCES

1. MD Singh and K B Khanchandani, **"Power Electronics"**, Tata McGraw Hill Publishing Company, 1998.
2. Vedam Subramanyam, **"Thyristor Control of Electric Drives",** Tata McGraw Hill Publilcations, Reprint 2001.
3. SK Pillai, **"A First Course on Electrical Drives"**, New Age International (P) Ltd., Reprint 2009.
4. R. Krishnan, **"Electric Motor & Drives Modeling, Analysis and Control"**, Prentice Hall of India, 1st Edition, 2001.
5. P.C.Sen, **"Thyristor DC Drives"**, John Wiley & Sons, New York, 2008.

E - RESOURCES

1. https://www.eeweb.com/electromechanical
2. https://www.electrical4u.com/electrical-drives/
3. http://nptel.ac.in/courses/108108077/

Course Outcomes

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

1. To paraphrase the characteristics of electric drives and control of D.C motors.
2. Analyze the control of D.C.motor by three phase converter.
3. Describe the various breaking operations of D.C motors by dual converter and choppers.
4. Express the control of induction motor by various converter topologies.
5. Analyze the control of induction motor through rotor side & control of synchronous motors by VSI.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70221	UTILIZATION OF ELECTRICAL ENERGY	L	T	P
Credits: 3		2	2	-

Prerequisites: Power Generation and Distribution System, DC Machines & AC Machines.

Course Objectives: This course deals with the fundamentals of illumination, electric heating and welding. It also emphasis on different kinds of electric drives, electric drive vehicles and their application to electrical traction systems.

MODULE I: Electric Heating and Welding **10 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 **10 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 **10 Periods**

A: System of electric traction and track electrification. Review of existing electric traction systems in India. Special features of traction motor.

B: Methods of electric braking – Plugging, rheostatic braking and regenerative braking.

MODULE IV: Electric Traction-II **9 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 **9 Periods**

Concept of electric drive vehicles and types – Battery electric vehicles, hybrid vehicles, plug-in hybrid electric vehicles and All-Electric vehicles. Benefits of electric drive vehicles.

TEXT BOOKS

1. E. Openshaw Taylor, **"Utilisation of Electric Energy",** Orient Longman, 1st Edition, 2006.
2. Partab, **"Art & Science of Utilization of Electrical Energy",** Dhanpat Rai & Sons, 3rd Edition, 2006.

REFERENCES

1. N.V.Suryanarayana, **"Utilization of Electrical Power Including Electric Drives and Electric Traction"**, New Age International (P) Limited, 1996.
2. C.L.Wadhwa, **"Generation, Distribution and Utilization of Electrical Energy",** New Age International (P) Limited, 1997.
3. J.B.Gupta, **"Utilisation Electric Power and Electric Traction"**, S.K.Kataria and Sons, 2000.
4. R.K.Rajput, **"Utilisation of Electric Power"**, Laxmi Publications Private Limited, 2007.
5. M.L. Soni, P.V. Gupta, V.S. Bhatnagar and A. Chakrabarti, **"A Text Book on Power System Engineering"**, Dhanpat Rai & Co., 2nd Edition, 2014.

E - RESOURCES

1. http://www.intelligent-power-today.com/
2. http://www.electricity-today.com/
3. http://nptel.ac.in/syllabus/108103009/

Course Outcomes

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

1. Understand various types of Electrical Heating, Welding.
2. Design various illuminating systems for various applications like domestic, Industry, commercial buildings.
3. Describe the different types of electric breaking and its characteristics.
4. Analyze speed – time characteristics of electric drive.
5. Choose a drive for a particular electrical application.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70426	**VLSI DESIGN** (Professional Elective-III) (Common for EEE and ECE)	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

Prerequisites: Electronic Circuits-I, Switching Theory & Logic Design / Digital Logic Design

Course Objectives:

The course aims to enable the student to visualize IC Fabrication steps and various IC technologies and to understand electrical properties of MOS, CMOS and Bi CMOS circuits.

The focus of the course is also on training the student to draw integrated circuit layouts following design rules. The course also helps the student to understand Basic Circuit Concepts, Gate Level Design, Basic architectures of Data path subsystems, Application Specific Integrated Circuits, of CPLDs and FPGAs.

MODULE I: IC Fabrication and Technologies **8 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 **10 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 **10 Periods**

A: VLSI Design Flow, MOS Layers, Stick Diagrams, Lambda based Design Rules and Layout, 2 µm CMOS Design rules for wires, Contacts and Transistors

B: 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 **10 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^2MOS) and Cascaded Voltage Switch logic(CVSL).

MODULE V: Data Path Subsystems, ASIC's and PLD's **10 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.
2. K. Lal Kishore, VSV. Prabhakar, **"VLSI Design"**, I. K international Publishing House Private Ltd, 2009.

REFERENCES

1. Neil H. E Weste, David Harris, Ayan Banerjee, **"CMOS VLSI Design - A circuits and systems perspective"**, Pearson Education, 3rd Edition, 2009.

E-RESOURCES

1. https://www.ece.uic.edu/~dutt/courses/ece565/lect-notes.html
2. http://www.egr.msu.edu/classes/ece410/mason/files/Ch2.pdf
3. http://www.mlrinstitutions.ac.in/sites/default/files/lecture_notes/4616fb64d32c6ee51d704e05e687557d-lecture-notes.pdf
4. http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=92
5. https://www.journals.elsevier.com/integration-the-vlsi-journal/
6. http://nptel.ac.in/courses/117106093/
7. http://nptel.ac.in/courses/117101058/
8. http://nptel.ac.in/courses/117106092/

Course Outcomes

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

1. Understand the Enhancement and Depletion mode transistors and describe the steps involved in IC fabrication.
2. Understand the electrical properties of MOS and able to describe problem due to CMOS Latch up and the remedies for that.
3. Illustrate circuit diagrams, stick diagrams and layouts for NMOS, CMOS and BiCMOS circuits and the effects of Scaling.
4. Describe Basic Circuit Concepts like resistance, capacitance and the effect of it , various Gate Level Designs.
5. Understand Basic architectures of Data path subsystems, Application Specific Integrated Circuits, of CPLDs and FPGAs.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70505	OBJECT ORIENTED PROGRAMMING THROUGH JAVA (Professional Elective-III) (Common for CSE and EEE)	L	T	P
Credits: 3		3	-	-

Prerequisites: Computer Programming

Course Objectives:

This course will make students able to learn and understand the concepts and features of object oriented programming and the object oriented concept like inheritance and will know how to make use of interfaces and package, to acquire the knowledge in Java's exception handling mechanism, multithreading, to explore concepts of Applets and event handling mechanism. This course makes students to gain the knowledge in programming using Layout Manager and swings.

MODULE I: OOP concepts & Introduction to C++, Java **9 Periods**

OOP concepts & Introduction to C++

Introduction to object oriented concepts : Object, class, methods, instance variables; C++ program structure; Standard Libraries; accessing class data members; Overview of Inheritance, Overloading, Polymorphism, Abstraction, Encapsulation and Interfaces.

Introduction to Java

History of JAVA, Java buzzwords, data types, variables, scope and life time of variable, arrays, operators, expressions, control statements ,type conversion and type casting, simple Java program.

MODULE II: Basics of JAVA

Classes and Objects **9 Periods**

Concepts of classes, Objects, constructors, methods, this key word , garbage collection overloading methods, constructors parameter passing ,recursion.String handling: string, string buffer, string tokenizer.

Inheritance

Base class object, subclass, member access rules, super uses, using final with inheritance, method overriding, abstract classes

MODULE III: Interfaces and Exception Handling

A: Interfaces **12 Periods**

Defining an interface, implementing interface, differences between classes and interfaces, extending interfaces. Packages - Defining, creating and accessing a package, importing packages, access control, exploring package-java.io.

B: Exception handling

Concepts of Exception handling, benefits of exception handling, exception hierarchy, checked and unchecked exceptions, usage of try, catch , throw, throws and finally, built-in exceptions, creating own exception subclasses.

MODULE IV: Multithreading and Event handling

Multithreading **9 Periods**

Differences between multithreading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

Event handling

Events, Event sources, event classes, event listeners, delegation event model, handling mouse and keyboard events, adapter classes, AWT class hierarchy, user interface components-labels, buttons, canvas, scrollbars, text components, checkbox, checkbox groups, choices, lists.

MODULE V: Layout manager and Swings **9 Periods**

Layout manager

Layout manager types-border, grid, flow, card and grid bag.

Swings

Introduction, limitations of AWT, components, containers, exploring swing-JApplet, JFrame and JComponent,Icons and Labels, Text Fields, buttons – the JButton class, Checkboxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees and Tables.

TEXT BOOKS

1. Herbert Schildt, "**Java The complete reference**", TMH, 8th edition
2. T. Budd, "**Understanding OOP with Java**", updated edition, Pearson Education.
3. Joyce Farrell, Cengage , "**Object Oriented Programming C++"**, 4th Edition ,2013

REFERENCES

1. P.J. Deitel and H.M. Deitel, "**Java for Programmers**", Pearson education.
2. P. Radha Krishna, "**Object Orientd Programming through Java**", Universities Press.
3. S. Malhotra and S. Choudhary, "**Programming in Java**", Oxford Univ. Press.
4. Bruce Eckel, "**Programming in Java**", Pearson Education.
5. Herbert Schildt , "**The Complete Reference, C++"**, TMH, 4th edition.

E- RESOURCES

1. http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVlXBW-YWRPf64_TFk2i4LJhgQFPQWAEt-Zobbm3twyubjRA1YOe9WVwkN2qGcxBwdHaPdi_mMQ
2. https://ndl.iitkgp.ac.in/result?q={"t":"search","k":"object%20oriented%20programming","s":["type=\"video\""],"b":{"filters":[]}}
3. http://www.rehancodes.com/files/oop-using-c++-by-joyce-farrell.pdf
4. http://www.nptel.ac.in/courses/106103115/36

Course Outcomes

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

1. Differentiate structured programming and object oriented programming and know the concepts of classes, objects, members of a class.
2. Apply object oriented programming features and concepts for solving given problems using inheritance and will know how to organize files in packages and concept of interface.
3. Capable of handling run time errors using Exceptional Handling and develop applications for concurrent processing using Thread Concept.
4. Design Applets that take user response through various peripheral devices such as mouse and keyboard by event handling mechanism.
5. Design interactive applications for use on internet.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70227	ENERGY AUDIT AND CONSERVATION (Professional Elective-III)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives: This course deals about the concept of energy conservation, energy management and different approaches of energy conservation in industries, economic aspects of energy conservation project and energy audit in commercial and industrial sector.

MODULE I: Basic Principles of Energy Audit **9 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 **9 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 **10 Periods**

A: Energy efficient motors, factors affecting efficiency, loss distribution, constructional details.
B: 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 **10 Periods**

Power Factor Improvement, Lighting: Power factor – Methods of improvement, location of capacitors, Pf with non linear loads, effect of harmonics on power factor. Power factor 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 **10 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. W.R. Murphy and G. Mckay, **"Energy Management",** Butter Worth Publications.
2. John. C. Andreas, **"Energy Efficient Electric Motors",** Marcel Dekker Inc Ltd, 2nd Edition, 1995.

REFERENCES

1. Paul O' Callaghan, **"Energy Management",** Mc-Graw Hill Book Company, 1st Edition, 1998.
2. W.C.Turner, **"Energy Management Hand Book",** A John Wiley and Sons.
3. S. C. Tripathy, "**Utilization of Electrical Energy**", Tata McGraw Hill, 1993.
4. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online).

5. L.C. Witte, P.S. Schmidt and D.R.Brown, **"Industrial Energy Management and Utilization",** Hemisphere Publication, Washington, 1998.

E - RESOURCES

1. http://industrialelectricalco.com/wp-content/uploads/2014/01/Understanding-Energy-Efficient-Motors-EASA.pdf
2. https://beeindia.gov.in/
3. https://beeindia.gov.in/sites/default/files/3Ch10.pdf

Course Outcomes

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

1. Examine the principles of Energy audit and its process in thermal power station, industries.
2. Analyze the different aspects of energy management.
3. Describe the characteristics of energy efficient motors.
4. Illustrate the power factor improvement, good lighting system practice and the types of energy instruments.
5. Analyze the economic aspects of Energy Management.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70228	SUPERVISORY CONTROL AND DATA ACQUISITION (Professional Elective-IV)	L	T	P
Credits: 4		3	2	-

Prerequisites: Power Generation and Distribution, Power System Analysis and Switching Theory and Logic Design.

Course Objectives: To develop architecture of SCADA to explain each unit in detail. To apply knowledge gained about SCADA systems to identify few real-life industrial applications.

MODULE I: Introduction to SCADA **13 Periods**

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.

MODULE II: Remote Terminal Units (RTU) **13 Periods**

General features, Functions and Applications, Benefits, Configurations of SCADA, RTU (Remote Terminal Units) connections. RTU Block diagram, MTU communication interface, Future trends, Internet based SCADA display system, Components of control systems in SCADA.

MODULE III: SCADA in Power Systems **13 Periods**

A: Main task in power systems- Planning, operation, accounting, tasks of national control centre, regional control centre, Generating station control room, AGC-SCADA,

B: SCADA in generation, SCADA in Power Distribution, SCADA in Power Grid.

MODULE IV: Supervisory Power Management **13 Periods**

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: Automatic mapping and facility management **12 Periods**

Introduction to 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. Stuart A. Boyer , **"SCADA"** , IAS 1999.
2. J. Parikh, B. Reddy & R. Benerjee **"Planning for demand side management in the electric sector",** TMH**.**
3. Terson , **"Power system Control Technology"** , Prentice Hall New Delhi

REFERENCES

1. Elliot L. Gruenberg, **"Hand book of Telemetry of Remote control"** , MGH New Delhi

2. Roddy & Coolen, **"Electronics Communication"**
3. S.S. Rao, **" Switch Gear & Protection"** , Khanna Publication, New Delhi
4. S.L. Uppal, **"Electric Power system"**
5. S K Gupta, **"Power System Engineering"** , Umesh Publication

E - RESOURCES

1. http://nptel.ac.in/courses/108106022/8
2. http://v5.books.elsevier.com/bookscat/samples/9780750669498/9780750669498.PDF

Course Outcomes

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

1. Know Need of SCADA, discrete and analog control, basic architecture of SCADA.
2. Understand the Basic concepts of Remote terminal units.
3. Comprehend the application of SCADA in generator control room, in power distribution and in power grid.
4. Estimate the power system operation states, energy audit discussion and substation automation and condition monitoring.
5. Analyze Intelligent automation control, equipment maintenance and feeder level automation for power system applications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70229	ELECTRICAL POWER QUALITY (Professional Elective-IV)	L	T	P
Credits: 4		3	2	-

Prerequisites: Power System Analysis, Power Electronics.

Course Objectives: This subject deals with power quality issues and solutions. It also discussed some of the power quality issues like interruptions and voltage sag with their reliability evaluation.

MODULE I: Introduction to Power Quality **13 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.

Power quality and EMC standards:

Introduction to standardization, IEC electromagnetic compatibility standards, European voltage characteristics standards, PO surveys.

MODULE II: Power Interruptions **13 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 **13 Periods**

A: 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.

B: Three phase faults, phase angle jumps, magnitude and phase angle for three phase unbalanced sags. Load influence on voltage sags.

MODULE IV: PQ Consideration in Industrial Power Systems **13 Periods**

Voltage sag-equipment behavior of power electronic loads, induction motors, synchronous motors, computers, consumer electronics adjustable speed AC drives and its operation. Mitigation of AC drives, adjustable speed DC drives and its operation, mitigation methods of DC drives.

MODULE V: Compensation Techniques for 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.

TEXT BOOKS

1. M.H.J Bollen, **"Understanding Power Quality Problems: Voltage Sags and Interruptions"**, New York: IEEE Press, 1999.
2. Roger. C. Dugan, Mark. F. McGranagham, Surya Santoso, H.Wayne Beaty, **"Electrical Power Systems Quality"**, McGraw Hill, 2003.

REFERENCES

1. R.S.Vedam, M.S.Sarma, **"Power Quality – VAR Compensation in Power Systems"**, CRC Press, 2013.
2. C. Sankaran, **"Power Quality"**, CRC press, Taylor & Francis group, 2002.
3. Ewald F. Fuchs, Mohammad A. S. Masoum, **"Power Quality in Power Systems and Electrical Machines"**, Academic Press, 2nd Edition, 2011.
4. Angelo Baggiri, **"Handbook of Power Quality"**, John Wiley & Sons, 1st Edition, 2008.
5. Francisco C. De La Rosa, **"Harmonics and Power Systems"**, CRC Press, 1st Edition, 2006.

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1. http://www.elec.uow.edu.au/apqrc/links
2. http://technav.ieee.org/tag/1354/power-quality#concepts
3. http://nptel.ac.in/courses/108106025/

Course Outcomes

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

1. Estimate severities of power quality problems in distribution system and understand the IEC, EMC standards.
2. Compute voltage sag from upstream to downstream.
3. Analyze the Causes of voltage sag and its characteristics for single phase and three phase system.
4. Evaluate the behavior of power electronic loads using various drives in industry.
5. Analyze the mitigation methods for power quality issues.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70230	HVDC AND FACTS (Professional Elective-IV)	L	T	P
Credits: 4		3	2	-

Prerequisites: Power Generation and Distribution, Power System Analysis and Power Electronics.

Course Objectives: This course deals with the basic concepts of HVDC transmission system, its applications and analysis of HVDC converters with their control circuitry. It also emphasizes on reactive power control in HVDC system using FACTS devices.

MODULE I: Introduction **13 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 **13 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 and 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 **13 Periods**

A: Reactive Power Requirements in steady state - Conventional control strategies - Alternate control strategies - Sources of reactive power - AC Filters – Shunt capacitors - Synchronous condensers.

B: 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 DC quantities - Solution of AC-DC power flow - Simultaneous method - Sequential method.

MODULE IV: Power Flow and Dynamic Stability **13 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: Static Series Compensators **12 Periods**

Concept of series capacitive compensation - Improvement of transient stability - Power oscillation damping. Functional requirements of GTO thyristor controlled series capacitor (GSC), thyristor switched series capacitor (TSSC), and thyristor controlled series capacitor (TCSC). Control schemes for GSC, TSSC and TCSC.

TEXT BOOKS

1. K.R.Padiyar, **"HVDC Power Transmission Systems"**, New Age International Publishers Limited, 3rd Edition, 2015.
2. N.G.Hingorani and L.Guygi, **"Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems"**, John Wiley & Sons, Inc., Reprint, 2012.

REFERENCES

1. Jos Arrillaga, **"HVDC Transmission"** , The Institution of Electrical Engineers, 2nd Edition, 1998.
2. S.Rao**, "EHVAC and HVDC Transmission Engineering and Practice: Theory, Practice and Solved Problems",** Khanna Publishers, 1990.
3. E.W.Kimbark, **"Direct Current Transmission"**, John Wiley & Sons, Inc., 1971.
4. E.Uhlmann, **"Power Transmission by Direct Current"**, Springer, 1st Edition, 2012.
5. Yong Hua Song and Allan T Johns, **"Flexible AC Transmission Systems (FACTS)",** The Institution of Electrical Engineers, 1999.

E - RESOURCES

1. https://www.electrical4u.com/facts-on-facts-theory-and-applications/
2. https://www.electrical4u.com/high-voltage-direct-current-transmission/
3. http://nptel.ac.in/courses/108104013/

Course Outcomes

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

1. Understand the applications and different types of HVDC links.
2. Analyze the converter configuration & their characteristics.
3. Describe the reactive power requirements in steady state & modeling of DC links.
4. Analyze the power flow in AC system & apply FACTS controllers for dynamic stability.
5. Describe the working principle of static series compensators.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code:	**OPEN ELECTIVE - II**	**L**	**T**	**P**
Credits: 3		**3**	**-**	**-**

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70222	SOLID STATE DRIVES LAB	L	T	P
Credits: 2		-	-	4

Course Objectives: Apply the concepts of power electronic converters for various applications of DC and AC machines. Design the power converter to meet a specific load requirement.

List of Experiments:

1. Speed Measurement and closed loop control using PMDC motor.

2. Thyristor based drive for PMDC Motor with speed measurement and closed loop Control.

3. IGBT based single phase 4 quadrant chopper drive for PMDC motor with speed Measurement and closed loop control.

4. Single Phase thyristor based drive for 1HP DC motor with closed loop control.

5. Three Phase thyristor based drive for 3 HP DC motor with closed loop.

6. Three Phase input IGBT based 4 quadrant chopper drive for DC motor with closed loop Control equipment.

7. Cycloconverter based AC Induction motor control.

8. Speed control of 3 phase wound rotor Induction motor Rheostatic control using static switching.

9. Single phase fully controlled converter with inductive load.

10. Single phase half wave controlled converter with inductive load.

11. PSPICE Simulation of Three phase Inverter with PMW Control.

12. PSPICE Simulation of Resonant Pulse Commutation circuit and Buck Chopper.

Course Outcomes

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

1. Analyze the PMDC motor through thyristorised drives.
2. Analyze the various capacity DC motors with thyristorised drive.
3. Understand the operation of 4 quadrant chopper drive for DC motor.
4. Use Cycloconverter based AC Induction motor control equipment
5. Analyze PSPICE Simulation for various power electronic converters.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70449	**MICROPROCESSORS AND MICROCONTROLLERS LAB** (Common for EEE and CSE)	**L**	**T**	**P**
Credits: 2		**-**	**-**	**4**

Course Objectives

To develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques, with practical exposure.

Note:

The Following programs/experiments are to be written for assembler and to be executed the same with 8086 and 8051 kits.

List of Experiments:

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. Interfacing to 8086 and programming to control stepper motor.
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.

Equipment Required for the Laboratory:

1. Computers :Pentium 4, Windows XP/7
2. Microprocessor/Microcontroller kits : 8086/ 8051
3. Software Required :MASM/TASM

Course Outcomes:

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

1. Understand the architecture of 8086 and 8051
2. Develop some piece of code for processor/ controller applications
3. Interface some input devices to 8086 and 8051
4. Interface some output devices to 8086 and 8051
5. Interface serial communication devices to 8051

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VII Semester		
Code: 70P02	MINI PROJECT	L	T	P
Credits: 2		-	-	4

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70231	EHVAC TRANSMISSION (Professional Elective-V)	L	T	P
Credits: 3		3	-	-

Prerequisites: Power Generation and Distribution, Power Transmission Systems.

Course Objectives: This course deals with the EHVAC transmission and modes of propagation. It also elaborates corona effects, voltage control and travelling wave theory.

MODULE I: Introduction **9 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:

Line inductance and capacitances – sequence inductances and capacitances – modes of propagation – ground return – Examples.

MODULE 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.

MODULE III: Corona Effects **10 Periods**

A: 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.

B: Radio interference (RI) - Corona pulses generation, Properties, Limits – Frequency spectrum – Modes of propagation – Excitation function – Measurement of RI, RIV and excitation functions – Examples.

MODULE IV: Electro Static Field and Traveling Wave Theory **10 Periods**

Electrostatic field: Calculation of electrostatic field of EHVAC 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.

MODULE V: Voltage Control **9 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, **"Extra High Voltage AC Transmission Engineering"**, New Academic Science Ltd., 4th Edition, 2011.
2. S. Rao **"EHVAC and HVDC Transmission & Distribution Engineering"**, Khanna publishers, 2008.

REFERENCES

1. Padiyar.K.R, **"FACTS Controllers in Power Transmission and Distribution"**, New Age International Publishers, 2007.
2. Arrillaga.J **"High Voltage Direct Current Transmission"**, 2nd Edition (London), Peter Peregrines, IEE, 1998.
3. Hingorani H G and Gyugyi. L, **"Understanding FACTS: Concepts and Technology of Flexible AC Transmission Systems",** New York, IEEE Press, 2000.
4. K.R. Padiyar, **"HVDC Power Transmission Systems"**, New Age International (p) Ltd. 2nd Revised Edition, 2012.
5. P. Sarma Maruvada, **"Corona Performance of High-Voltage Transmission Lines"**, Research Studies Press, 2000.

E - RESOURCES

1. http://www.egr.unlv.edu/~eebag/TRANSMISSION%20LINES.pdf
2. http://www.radio-electronics.com/
3. https://electricalnotes.wordpress.com/2011/03/23/what-is-corona-effect/

Course Outcomes

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

1. Understand the necessity of EHV AC Transmission.
2. Describe the voltage gradients of various conductors.
3. Analyze the power loss & audible noise due to corona.
4. Examine the electrostatic field in EHV AC lines and travelling waves.
5. Evaluate the voltage control by various compensators.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70232	ELECTRIC SMART GRID (Professional Elective-V)	L	T	P
Credits: 3		3	-	-

Prerequisites: Power System Analysis, Power System Operation and Control.

Course Objectives: This course is introduced to provide an overview of the smart grid and to understand the various aspects of the smart grid, including Technologies, Components, Architectures and Applications.

MODULE I: Introduction to Smart Grid **10 Periods**

Review Basic Elements of Electrical Power Systems: The Origins of the Power Grid - How the Grid Grew - A Primer on Today's Electrical Utilities - Desirable Traits of a Modern Grid – Principal Characteristics of the Smart Grid - Government and Industry Standardization – Standards and Electricity Markets.

MODULE II: Smart Grid Communications **10 Periods**

Two - way Digital Communications Paradigm, Network Architectures, IP-based Systems, Power Line Communications, Advanced Metering Infrastructure. **Measurements:** Sensor Networks, Phasor Measurement Units, Communications Infrastructure, Fault Detection and Self-Healing Systems, Applications and Challenges.

MODULE III: Distribution System Management **10 Periods**

A: Data sources and associated external systems, Modeling and analysis tools, applications.

B: 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 **9 Periods**

Energy and reserve markets, market power, generation firms, locational marginal prices, financial transmission rights.

MODULE V: Security and Privacy **9 Periods**

Cyber Security Challenges in Smart Grid, Load Altering Attacks, False Data Injection Attacks, Defense Mechanisms, Privacy Challenges.

TEXT BOOKS

1. James Momoh, **"Smart Grid Fundamentals of Design and Analysis"**, IEEE Press, 2012.
2. Janaka Ekanayake, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama and Nick Jenkins, **"Smart Grid Technology and Applications"**, IEEE Press, 2012.

REFERENCES

1. Aranya Chakraborthy and Marija D llic, **"Control and Optimization Methods for Electric Smart Grids"**, Editor, Springer Publications.
2. Lars T. Berger, Krzysztof Iniewski, **"Smart Grid applications, Communications and Security"**, John Wiley Publishers Ltd., 2012.
3. Yang Xiao, **"Communication and Networking in Smart Grids"**, CRC Press, Taylor and Francis Group, 2012.
4. Caitlin G. Elsworth, **"The Smart Grid and Electric Power Transmission"**, Nova Science

Publishers, 2010.
5. Krzysztof Iniewski **, "Smart Grid Infrastructure & Networking",** McGraw Hill Education, 2012.

E - RESOURCES

1. http://www.ee.ucr.edu/~hamed/Smart_Grid_Topic_2_Smart_Grid.pdf
2. http://www.ee.ucr.edu/~hamed/Smart_Grid_Topic_3_Communications.pdf
3. https://www.eeweb.com/power-management

Course Outcomes

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

1. Describe the characteristics of smart grid.
2. Describe the concepts & principles of communications technologies for smart grid.
3. Analyze the demand response and energy consumption.
4. Analyze the market operations & financial transmission rights.
5. Describe the security challenges in smart grid.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70233	ADVANCED POWER ELECTRONICS (Professional Elective–V)	L	T	P
Credits: 3		3	-	-

Prerequisites: Power Electronics.

Course Objectives: To understand the operation of various semiconductor 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 10 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: PWM Techniques 10 Periods

Introduction, Sinusoidal PWM, Modulation Scheme, Harmonic Content, Over Modulation, 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 10 Periods

A: Need for Multilevel Inverters, Multilevel Concept, Classification of Multilevel Inverters – Diode Clamped Multilevel Inverter- Principle of Operation – Main Features.

B: 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 9 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 V: Resonant Converters 9 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. M.H. Rashid, **"Power Electronics: Circuits, Devices and Applications",** Pearson Education India, 2009.
2. Ned Mohan, Tore M. Undeland and William P. Robbins, **"Power Electronics: Converters, Applications and Design"**, A John Wiley & Sons, Inc., Publication, 3rd Edition, 2003.

REFERENCES

1. Bin Wu, **"High-Power Converters and AC Drives",** A John Wiley & Sons, Inc., Publication, 2006.
2. Keith Billings and Taylor Morey, "**Switch Mode Power Supply Handbook**", McGraw Hill, 3rd Edition, 2011.
3. Robert W., Erickson, Dragan and Maksimovic, **"Fundamentals of Power Electronics"**, Kluwer Academic Publishers, 2nd Edition, 2001.
4. Marian K. Kazimierczuk, **"Pulse-width Modulated DC–DC Power Converters"**, A John Wiley & Sons, Inc., Publication, 2nd Edition, 2015.
5. Bimal K Bose, **"Modern Power Electronics–Evolution, Technology and Application"**, IEEE Press, 1st Edition, 1992.

E - RESOURCES

1. http://engineering.electrical-equipment.org/electrical-distribution/introduction-to-multilevel-inverter.html
2. http://nptel.ac.in/courses/108105066/PDF/L-38(DP)(PE)%20((EE)NPTEL).pdf
3. http://www.intelligent-power-today.com/

Course Outcomes

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

1. Understand the operation and feature of various modern power semiconductor devices.
2. Comprehend the different types of pulse width modulation techniques.
3. Analyze the need of Multilevel Inverters & Principle of Operation various multilevel Inverters.
4. Learn the overview of Switching Power Supplies & Control of Switch Mode DC Power Supplies.
5. Analyze the various types of resonant Converters and their applications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70234	HIGH VOLTAGE ENGINEERING (Professional Elective–VI)	L	T	P
Credits: 3		3	-	-

Prerequisites: Applied Chemistry, Power Transmission Systems and Switch Gear & Protection.

Course Objectives: This course deals with the detailed analysis of Breakdown occur in gaseous, liquids and solid dielectrics. It also emphasis on generation and measurement of high voltage and current, high voltage testing methods.

MODULE I: Introduction to High Voltage Technology and Applications **9 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 **10 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 **10 Periods**

A: 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.

B: Measurement of high direct current voltages, measurement of high alternating voltages and impulse voltages, measurement of high currents - direct, alternating and impulse, oscilloscope for impulse voltage and current measurements.

MODULE IV: Over Voltage Phenomenon and Insulation Co-Ordination **9 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-Destructive Testing of Material, Electrical Apparatus & High Voltage Testing **10 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, 4th Edition, 2009.
2. E.Kuffel, W.S.Zaengl, J.Kuffel, **“High Voltage Engineering: Fundamentals”**, Cbs Publishers New Delhi, 2nd Edition, 2005.

REFERENCES

1. C.L. Wadhwa, **"High Voltage Engineering",** New Age Internationals (P) Limited, 3rd Edition, 2010.
2. Ravindra Arora & Wolfgang Mosch ,**"High Voltage Insulation Engineering"**, New Age International (P) Limited, 1st Edition, 1995.
3. Subir Ray, **"An Introduction to High Voltage Engineering"**, PHI Learning Private Limited, New Delhi, 2nd Edition, 2013.
4. L.L. Alston, **"High Voltage Technology"**, Oxford University Press, First Indian Edition, 2011.
5. T.J.Gallagher and A.J Pearmain, **"High Voltage Measurement, Testing and Design"**, Wiley, New York, 2nd Edition, 2007.

E - RESOURCES

1. http://www.mv.helsinki.fi/tpaulin/Text/hveng.pdf
2. www.electricity-today.com
3. http://nptel.ac.in/courses/108104048/

Course Outcomes

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

1. Appraise the applications of solid, liquid and gaseous dielectrics in electrical engineering.
2. Appraise in gaseous insulators media & Breakdown in Composite dielectrics and solid dielectrics.
3. To paraphrase the types of generation of high A.C., D.C. and Impulse voltage existing in research centers all over the world.
4. Appraise the causes for over voltage in EH and principles of insulation co-ordination in HV and EHV in power systems
5. Demonstrate the existing testing techniques to test all the electrical equipments before commissioning into service.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70235	NEURAL NETWORKS AND FUZZY LOGIC (Professional Elective-VI)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course 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.

MODULE I: Introduction to Neural Networks **10 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:

Model of an Artificial Neuron, Types of Activation Functions, ANN Architectures, Classification Taxonomy of ANN, Connectivity: Vertices, Edges and Digraph, Learning Methods (Supervised, Unsupervised, Reinforced), Learning Rules, Types of Application.

MODULE II: Single Layer Feed Forward Neural Networks **10 Periods**

Introduction, Perceptron Models: Simple Perceptron Model and Multilayer feed forward perceptron model, Training Algorithms, Limitations of the Perceptron Model, Applications.

Multilayer Feed Forward Neural Networks:

Credit Assignment Problem, Generalized Delta Rule, and Back propagation (BP) Training algorithm.

MODULE III: Associative Memories **10 Periods**

A: 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).

B: 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.

MODULE IV: Classical & Fuzzy Sets **9 Periods**

Introduction to classical set theory - Operations on Crisp sets, Properties of Crisp sets and Crisp Relations. Fuzzy sets, Uncertainty, Membership function, Properties, Fuzzy relations.

MODULE V: Fuzzy Logic System Components and Fuzzy Logic Applications **9 Periods**

Fuzzy logic, Fuzzy Quantifiers, Fuzzy Inference, Fuzzification, Fuzzy rule based system, Defuzzification, Defuzzification methods, Fuzzy logic applications.

TEXT BOOKS

1 Bart Kosko, **"Neural Networks and Fuzzy Logic System"**, Prentice Hall of India, 1991.

2 S.Rajasekaran and G.A.V.Pai, "**Neural Networks, Fuzzy Logic & Genetic Algorithms**", Prentice Hall of India, New Delhi, 2003.

REFERENCES

1. James A Freeman and Davis Skapura, **"Neural Networks"**, Pearson Education, 2002.
2. Simon Haykin, **"Neural Networks and Learning Machines"**, Pearson Education, 3rd Edition, 2009.
3. C.Eliasmith and CH.Anderson, **"Neural Engineering"** 1st Edition, Prentice Hall of India, 2009.
4. Jacek M. Zurada, **"Introduction to Artificial Neural Systems"**, 1st Edition, Jaico Publishing House, 2006.
5. Rober J. Schalkoff, "**Artificial Neural Networks**", Tata McGraw Hill Edition, 2011.

E - RESOURCES

1. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_neural_networks.htm
2. http://uni-obuda.hu/users/fuller.robert/nfs.html
3. http://nptel.ac.in/courses/108104049/

Course Outcomes

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

1. Comprehend the concept of neural networks.
2. Analyze various feed forward networks.
3. Understand the importance of Associative memories.
4. Comprehend classical, fuzzy set theories and the components of fuzzy logic systems.
5. Analyze the application of fuzzy logic control to real time systems.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70236	ELECTRICAL ESTIMATION AND COSTING (Professional Elective – VI)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives: To expose the subject highlights on elements of estimation and costing, budgeting of service connections and also about contracting, maintenance.

MODULE I: Elements Of Estimating & Costing Of Domestic And Industrial Wiring **9 Periods**

Definition of ―Estimation‖, Types of estimation and estimation tools, Overhead and service charges, Purchase procedure. Layout and wiring diagram for residential building and industrial wiring, Selection of number of circuit for project as per IE rules, Estimation for residential wiring and industrial wiring, I.E. rules observed for above wiring.

MODULE II: Estimating & Costing Of Service Connections **10 Periods**

Survey work for domestic and industrial service connection, Lay out/ wiring diagram of service connection (given project work), List of materials and accessories along with specifications required for given project work, Estimation of service connection for domestic and industrial (1phase and 3phase) service connections, I.E. rules pertaining to above wiring.

MODULE III: Estimation Of Over Head And Underground Distribution Line **10 Periods**

A: Survey work for estimation of overhead and underground distribution system, Planning and layout of project, List of materials and accessories required for the given project.

B: Procedure for preparing estimate for 440 V, 3 phase, 4 wire or 3 wire overhead and underground distribution system, Necessary drawing/ sketches of overhead and underground service connection, I.E. rules pertaining to above project.

MODULE IV: Estimating & Costing Of Electrical Product **10 Periods**

Market survey for cost of given product like D.O.L. starter, small motor, monoblock pump, automatic electric iron, table/ceiling fan, ICDP/ICTP switch etc, Preparation of detailed drawing work of the product, Preparation of material quantity sheet for the product, Market survey for availability of required materials, their cost and other requirements, Preparation of cost schedule of product, Find out cost of product considering material cost, labour cost and overhead charges, Validation of cost schedule, Financial arrangement for the product.

MODULE V: Estimating & Costing Of Repair & Maintenance Of Electrical Devices And Equipment & Contracting **9 Periods**

Location of fault, Materials required and their cost for remedial measure of fault, Estimation of repairing cost.

Estimation of maintenance, servicing and testing cost including labour cost(service charge), Tools used for repairs & maintenance work, Detailed estimation and preparation of cost schedule for repair and maintenance of electric fan, automatic electric iron, single phase transformer, mixy, D.O.L.starter etc.

Principles of contracting :Terms, conditions, and types of contract system,Tender,tendering procedure and preparation of simple tender, Terms and conditions of tender, procedure for inviting and scrutinizing of tender, Importance of Earnest Money Deposit, Security Deposit and S.O.R

TEXT BOOKS

1. S.L. Uppal, **"Electrical wiring, estimating and costing",** Khanna Publisher
2. S.K. Bhattacharya – "**TTTI"**, Chandigarh.

REFERENCES

1. M.N. Bajpai- **" Electrical estimating and costin**g**"** , Saroj publication.
2. S.O.Rs of P.W.D. Govt. departments.
3. I.E. rules gadget.

E - RESOURCES

1. http://www.navodayaengg.in/study-material/eee/semester-viii/estimation-and-costing/
2. http://arieseee.blogspot.in/2013/04/electrical-installation-and-estimation.html
3. http://www.cercind.gov.in/ElectSupplyAct1948.pdf

Course Outcomes

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

1. Understand elements of estimating & costing of domestic and industrial wiring.
2. Comprehend the estimation of service connection for domestic and industrial service connections.
3. Analyze the estimation of over head and underground distribution line.
4. Estimate and prepare the cost schedule for a given electrical product.
5. Understand the maintenance of electrical devices and principles of contracting.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code:	OPEN ELECTIVE - III	L	T	P
Credits: 3		3	-	-

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech VIII Semester		
Code:70P03	ENTREPRENEURSHIP (Common for CE, EEE, ME, ECE, CSE, IT and Min.E)	L	T	P
Credits: 1		-	2	-

PRE-REQUISITE: NIL

Course Objectives:
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: Entrepreneurship **6 Periods**
Entrepreneurship: Concept, knowledge and skills requirement; characteristic of successful entrepreneurs; entrepreneurship process; factors impacting emergence of entrepreneurship;
Differences between Entrepreneur and Intrapreneur, Understanding individual Entrepreneurial Mindset and personality, recent trends in entrepreneurship.

MODULE II: starting the new venture **6 Periods**
Starting the venture: generating business idea – sources of new ideas, methods of generating ideas, creative problem solving, opportunity recognition; environmental scanning, competitor and industry analysis;
Feasibility study – market feasibility, technical/operational feasibility, financial feasibility; drawing business plan; preparing project report; presenting business plan to investors.

MODULE III: Sources of Finance and Entrepreneurship programs **8 Periods**
A: Sources of finance: Various sources of Finance available: Long term sources Short term sources- Institutional Finance – commercial Banks, SFC's in India - NBFC's in India - their way of financing in India for small and medium business.
B: Entrepreneurship development programs in India: The entrepreneurial journey- Institutions in aid of entrepreneurship development: MDI, NIESBUD, EDII, IED. EDP's of SIDBI.

MODULE IV: Entrepreneurship Development and Women entrepreneurship **6 Periods**
Entrepreneurship Development and Government: Role of Central Government and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants - Export Oriented Units - Fiscal and Tax concessions available..
Women entrepreneurship: Role and Importance, Growth of women entrepreneurship in India, Issues & challenges - Entrepreneurial motivations.

MODULE V: Entrepreneurship - Law and strategy **6 Periods**
Entrepreneurship and Law: Intellectual property Rights-Patents, Copyrights-Trademarks and Trade secrets- Licensing- franchising, Legal issues and challenges of new venture startups.
Strategic perspectives in entrepreneurship: Strategic planning-Strategic actions- strategic positioning-Business stabilization- Building the adaptive firms-Understanding the growth stage-Unique managerial concern of growing ventures.

TEXT BOOKS
1. D F Kuratko and T V Rao, **"Entrepreneurship-A South-Asian Perspective"**, Cengage Learning Publications, 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"**, 2nd Edition, Oxford Publications, 2012.
3. B.Janakiram and M.Rizwana, **"Entrepreneurship Development:Text &Cases"**, Excel Books, 2011.
4. Stuart Read, **"Effectual Entrepreneurship",** Routledge, 2013.
5. Nandan H, **"Fundamentals of Entrepreneurship",** PHI, 2013

E-RESOURCES

1. http://freevideolectures.com/Course/3641/Entrepreneurship-Through-the-Lens-of-Venture-Capital
2. http://www.onlinevideolecture.com/?course=mba-programs&subject=entrepreneurship
3. http://nptel.ac.in/courses/122106032/Pdf/7_4.pd
4. https://www.scribd.com/doc/21516826/Entrepreneurship-Notes
5. http://freevideolectures.com/Course/3514/Economics-/-Management-/-Entrepreneurhip/50

Course Outcomes:

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

1. Understand the concept of entrepreneurship and challenges in the world of competition.
2. Understands the process of launching a new venture.
3. Understand the sources of finance and also the various entrepreneurship development programmes.
4. Understand the role of government in the development of Entrepreneurship and also gain the knowledge of women entrepreneurship.
5. Understand the legal aspects of entrepreneurship and also the Strategic perspectives of Entrepreneurship.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70P04	COMPREHENSIVE VIVA VOCE	L	T	P
Credits: 2		-	-	4

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70P05	MAJOR PROJECT	L	T	P
Credits: 12		-	-	18

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. VIII Semester		
Code: 70A06	FINE ARTS/FOREIGN LANGUAGE	L	T	P
Credits: Nil		-	2	-

OPEN ELECTIVES

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70132	AIR POLLUTION AND CONTROL (Open Elective)	L	T	P
Credits: 4		3	2	-

Prerequisite: Nil

Course 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 **13 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 **13 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 Behavior **12 Periods**

A: Meteorology 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 Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

MODULE IV: Control of Particulates **13 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 NOx and SOx Emissions **13 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. Daniel Vallero, **"Air Pollution Control: A Design Approach"** Academic Press, 5th Edition, 2014.
2. Karl B. Schnelle, Jr., Russell F. Dunn, Mary Ellen Ternes, "**Air Pollution Control Technology Handbook", CRC** Press, 2nd Edition, 2015.
3. Thad Godish, Wayne T. Davis, Joshua S. Fu, **"Air Quality",** CRC Press, 5th Edition, 2014.
4. Kenneth C. Schifftner, "**Air Pollution Control Equipment Selection Guide",** CRC Press, 2nd edition, 2013.

5. Marco Ragazzi, "**Air Quality: Monitoring, Measuring, and Modeling Environmental Hazards",** Apple Academic Press, 1st edition, 2016.

E RESOURCES:

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.

Course Outcomes:

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

1. Identify different sources of air pollution and the effects on human and environment.
2. Gain knowledge in computation of air pollutant removal of gases like SOx, NOx, CO etc.
3. Understand the importance of meteorological parameters like wind, pressure, humidity in dispersing air pollutants.
4. Gain knowledge in designing and operating particulate air control equipment.
5. Acquire the knowledge in designing the control system for gaseous air pollutants.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70241	ELECTRICAL SAFETY AND ENERGY MANAGEMENT (Open Elective)	L	T	P
Credits: 4		3	2	-

Prerequisite: Nil

Course Objectives: This course deals with the general safety requirements during the electrical installations. The course emphasis on the various objectives of energy management and auditing.

MODULE I: RULES & REGULATIONS [13 Periods]

Power sector organization and their roles – significance of IE rules & IE acts – general safety requirements: Span conductor configuration, spacing and clearing, sag, erection, hazards of electricity.

MODULE II: INSTALLATION AND EARTHING OF EQUIPMENTS [13 Periods]

Classification of electrical installation - earthing of equipment bodies – electrical layout of switching devices and SC protection – safety in use of domestic appliances – safety documentation and work permit system – flash hazard calculations – tools and test equipments.

MODULE III: SAFETY MANAGEMENT AND FIRST AID [12 Periods]

A:Safety aspects during commissioning – safety clearance notice before energizing – safety during maintenance – maintenance schedule – special tools – security grand– check list for plant security – effects of electric and electromagnetic fields in HV lines and substations.

B:Safety policy in management & organizations – economic aspects – safety program structure – elements of good training program – first aid – basic principles – action taken after electrical shock – artificial respiration and methods – chocking – poisoning.

MODULE IV: FIRE EXTINGUISHERS [13 Periods]

Fundamentals of fire – initiation of fires – types – extinguishing – techniques – prevention of fire – types of fire extinguishers- fire detection and alarm system – CO2 and Halogen gas schemes, foam schemes.

MODULE V: ENERGY MANAGEMENT & ENERGY AUDITING [13 Periods]

Objectives of energy management – energy efficient electrical systems – energy conservation and energy policy – renewable source of energy – energy auditing – types and tips for improvement in industry.

TEXT BOOKS

1. John Codick, **"Electrical safety hand book",** McGraw Hill Inc, New Delhi, 2000.
2. V. Manoilov, **"Fundamentals of electrical safety",** Mir Publishers, MOSCOW, 1975.

REFERENCES

1. C.S. Raju, **"A Practical Book on domestic safety",** Sri Sai Publisher, Chennai, 2003.
2. **Power Engineering Hand book**, TNEB Engineers officers, Chennai, 2002.

3. S. Rao, R.C. Khanna, **"Electrical safety, Fire safety engineering and safety management"**, Khanna Publisher, Delhi, 1998.
4. The Indian electricity rules, 1956, authority regulations, 1979, Commercial Law Publication, Delhi, 1999.
5. W.F.Cooper, **"Electrical safety Engineering"**, Newnes-Butterworth company, 1978.

E-RESOURCES

1. http://nptel.ac.in/courses/103106071/5
2. https://beeindia.gov.in/
3. https://www.electrical4u.com/equipment-earthing/
4. https://www.electricaltechnology.org/2015/05/earthing-and-electrical-grounding-types-of-earthing.html

Course Outcomes

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

1. Gain basic knowledge on Indian Power sector organization and their roles.
2. Understand the concepts of earthing and its standards.
3. Acquire the basic knowledge on First aid and safety during electrical installation..
4. Distinguish various fire extinguishers and their classification.
5. Understand the basic concepts of energy auditing.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70355	INDUSTRIAL SAFETY (Open Elective)	L	T	P
Credits: 4		3	2	-

Prerequisites: Nil

Course Objectives:

The purpose of this course is to teach the concept of Industrial Safety & provide useful practical knowledge for workplace safety which helps identification, evaluation and control of all the hazards and potential hazards to prevent or mitigate harm or damage to people, property or the environment.

MODULE I: Introduction [13 Periods]

Definition-Development before industrial revolution-Milestones in industrial safety movement Development of accident prevention programs-3 E's of safety- Development of Safety organizations-Safety and health movement- Managing emergency in industries.

MODULE II: Accident Prevention [13Periods]

Safety and productivity-Fallacies about safety-Industrial psychology in accident prevention Basic philosophy of accident prevention-Unsafe condition, Unsafe act, Injury, Fault of persons Cost of accidents- Safety education.

MODULE III: Safety Organization & Industrial Hygiene and Hazards [12 Periods]

A: Purpose of a safety organization-Safety policy- Safety committee- types- Role of safety coordinator- Responsibilities, Interferences and Sufferings of safety supervisor-Safety publicity-Accident reporting-Accident investigation-Accident statistics-Safety audits.

B: OSHA and industrial hygiene-work site analysis-recognizing and controlling hazards Occupational diseases prevention-Employee welfare-Statutory welfare schemes, Non statutory schemes-Health hazards-Control strategies- Fire hazards and prevention, Electrical hazard prevention and safety.

MODULE IV: Industrial Process Safety [13 Periods]

Overview-Safety performance by industry sector-Incident pyramid-Process hazard and risk. Failure of defenses - Process safety management-Scope, Functions, Features and Characteristics. Role of organizational levels in Process safety Management-Assessing organizations safety effectiveness.

MODULE V: Human Side of Safety [13 Periods]

Management of change-Process and equipment integrity-Human behavior aspects and modes-The Swiss cheese model of industrial accidents-Active and Latent failures-examples - Safety lessons Human Factors influencing the likelihood of failure-Organizational culture, Demographic effects.

TEXT BOOKS

1. Krishnan N.V., **"Safety in Industry",** Jaico Publisher House, 2005.
2. Singh, U.K. and Dewan, J.M., "**Safety, Security and risk management",** APH Publishing Company, New Delhi, 2005.

REFERENCES

1 C. Ray Asfahl, David W. Rieske **" Industrial Safety and health management",** Prentice Hall,2009.
2 R.K. Mishra, **"Safety Management"**, AITBS publishers, 2012.
3 Krishnan N.V., "**Safety in Industry**", Jaico Publisher House, 2005
4 Singh, U.K. and Dewan, J.M., "**Safety, Security and risk management**", APH Publishing Company, New Delhi, 2005.
5 C. Ray Asfahl, David W. Rieske " **Industrial Safety and health management**", Prentice Hall,2009.

E - RESOURCES

1 https://issuu.com/stmjournalspublication/docs/journal_of_industrial_safety_engine
2 http://www.nsc.org.in/index.php?option=com_content&view=article&id=15&Itemid=99
3 http://www.mdpi.com/journal/safety
4 http://www.sciencedirect.com/science/journal/09219110?sdc=1

Course outcomes

At the end of the course, students should be able to

1. Identify the evaluation of industrial safety and health standards.
2. Analyze the philosophies behind industrial accidents.
3. Apply the hierarchical levels in a safety organization and apply the types of industrial hazards and preventive measures.
4. Implement the concept of industrial process safety.
5. Apply the safety procedures for human.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70446	PRINCIPLES OF COMMUNICATION ENGINEERING (Open Elective)	L	T	P
Credits: 4		3	2	-

Prerequisites: Nil

Course Objectives: To study different modulation techniques used in analog communications and digital communications. To also introduce basics of satellite and optical communications.

MODULE I: Fundamentals of Analog Communication [16 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: Band-pass Modulation Techniques [12 Periods]

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Costasloop, DPSK.

MODULE III: Base Band Transmission Techniques [12 Periods]

A: Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, companding – analog and digital – percentage error,

B: delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Intersymbol interference, eye patterns.

MODULE IV: Spread Spectrum and Multiple Access Techniques [12 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 [12 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, Pearson Education, 2007.
2. Simon Haykin, **"Communication Systems",** 4th Edition, John Wiley & Sons, 2001.

REFERENCE BOOKS:

1. H.Taub,DL Schilling,G Saha**,"Principles of Communication**", 3rd Edition, 2007.
2. B.P.Lathi,"**Modern Analog And Digital Communication systems**", Oxford University 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.

E-RESOURCES:

1. Notes on Communication Systems - https://courses.engr.illinois.edu/ece458/comms2.pdf (Relevant: Chapters 1 to 3)
2. Notes on Modulation Techniques - http://www.ece.lehigh.edu/~jingli/teach/F2005CT/notes/AnalogCommunication.pdf
3. Notes on Digital Communication - https://www.cl.cam.ac.uk/teaching/0708/DigiCommI/dc1.pdf
4. https://www.britannica.com/technology/satellite-communication
5. http://www.radio-electronics.com/info/satellite/communications_satellite/satellite-communications-basics-tutorial.php
6. http://nptel.ac.in/courses/117105131/
7. http://nptel.ac.in/courses/117104127/

Course Outcomes:

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

1. Understand fundamentals of analog communications.
2. Classify different band-pass modulation schemes.
3. Categorize the different base-band modulation schemes.
4. Examine spread spectrum techniques and multiple access mechanisms.
5. Get basic knowledge on satellite and optical communications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70537	SOFTWARE QUALITY ASSURANCE AND TESTING (Open Elective)	L	T	P
Credits: 4		3	2	-

Prerequisites: Nil

Course Objectives: This course will enable students to learn and understand the importance of standards in the quality management process and their impact on the final product, identify, implement and analyze software quality metrics, learn how to plan a software testing strategy and methodology and to gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.

MODULE I: Software Quality Assurance Framework and Standards [12 Periods]

SQA Framework - Definition of Quality, Software Quality Assurance, Components of Software Quality Assurance, Software Quality Assurance Plan: Steps to develop and implement a Software Quality Assurance Plan.

Quality Standards - ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma.

MODULE II: SQA Metrics and Methodologies [13 Periods]

Software Quality Assurance Metrics - Software Quality Metrics, product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs.

Software Quality metrics methodologies - Establish quality requirements, Identify Software quality metrics, implement the software quality metrics, analyze software metrics results, validate the software quality metrics.

MODULE III: Software Testing Strategy and Environment Establishing [13 Periods]

A: Software Testing Strategy and Environment Establishing - Testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing.

B: Software Testing Methodology - Defects hard to find, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist.

MODULE IV: Software Testing Techniques & Tools [13 Periods]

Software Testing Techniques - Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing, White-Box Testing.

Software Testing Tools - Taxonomy of testing tools, Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Java Testing Tools, JMetra, JUNIT and Cactus.

MODULE V: Testing Process and Applications [13 Periods]

Testing Process - Eleven Step Testing Process: Assess Project Management Development Estimate and Status, Develop Test Plan, Requirements Phase Testing, Design Phase Testing, Program Phase Testing, Execute Test and Record Results, Acceptance Test, Report test results, testing software installation, Test software changes.

Testing Applications - Evaluate Test Effectiveness, Testing Specialized Systems and Applications Testing Client/Server, Web applications, Testing off the Shelf Components, Testing Security, Testing a Data Warehouse.

TEXTBOOKS

1. William E.Lewis, **"Software Testing and Continuous Quality Improvement",** Technical Press, 3rd Edition, 2010.
2. Stephen H.Kan, **"Metrics and Models in Software Quality Engineering**", 2nd Edition, Addison-Wesley Professional, 2003.

REFERENCES

1. William E. Perry, "**Effective Methods for Software Testing**", 3rd Edition, Published by Wiley & Sons, 2006.
2. Dr.K.V.K.K. Prasad, "**Software Testing Tools",** Dream Tech Publishers, 3rd Edition, 2009.

E-RESOURCES

1. https://tienhuong.files.wordpress.com/2009/08/software-testing-and-continuous-quality-improvement-second-edition.pdf
2. https://hientl.files.wordpress.com/2011/12/effective-methods-for-software-testing2.pdf
3. http://ndl.iitkgp.ac.in/document/zyMnqgZQXCJME6wgSqrU87VCGcelOw5mZ-ybmrhKBj79VQPP0_ZQHLqcOopPDoaFWhZybCrPg_joTbBU8ZpGA
4. http://nptel.ac.in/courses/106101061/18

Course Outcomes:

On the successful completion of the course, a student will be able to:

1. Define Software Quality Assurance Framework and Standards
2. Outline various Metrics, Methodologies for Measuring SQA.
3. Classify the Software Testing Strategy and Associate it with the Test Environment.
4. Select a Specific Testing Technique and Tool for Software Development.
5. Apply the Test Process on various Software Domains.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code:70619	INFORMATION RETRIEVAL SYSTEMS (Open Elective)	L	T	P
Credits: 4		3	2	-

Prerequisites: Nil

Course Objectives:
This course enables the students to study the fundamentals of DBMS, Data warehouse and Digital libraries, various preprocessing techniques, indexing approaches, various clustering approaches and study different similarity measures. It explores cognitive approaches and search techniques and identifies retrieval techniques in multimedia information systems and query languages.

MODULE I: Information Retrieval Systems and Capabilities [13 Periods]
Introduction- Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries.
Capabilities- Data Warehouses, Information Retrieval System Capabilities, Search capabilities, Browse capabilities, Miscellaneous capabilities.

MODULE II: Cataloging and Indexing [13 Periods]
Cataloging - Objectives, Indexing Process, Automatic Indexing, Information Extraction, Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.
Indexing- Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

MODULE III: Clustering and Search Techniques [12 Periods]
A: Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.
B: User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext.

MODULE IV: Visualization and Evaluation [13 Periods]
Information Visualization- Introduction, Cognition and perception, Information visualization technologies, Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.
Information System Evaluation- Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

MODULE V: Retrieval Techniques and Libraries [13 Periods]
Multimedia Information Retrieval- Multimedia Information Retrieval, Models and Languages, Data Modeling, Query Languages, Indexing and Searching.
Digital Libraries- Libraries and Bibliographical systems, online IR system, OPACs, Digital Libraries.

TEXT BOOKS:
1.Kowalski, Gerald J.Maybury, Mark T, **"Information Storage and Retrieval systems Theory and Implementation"**, 2nd Edition, 2000.
2. Ricardo Baeza-Yate, **"Modern Information Retrieval"**, Pearson Education, 2007.

REFERENCES:

1. David A Grossman and Ophir Frider, **"Information Retrieval: Algorithms and Heuristics",** 2nd Edition, Springer.
2. Frakes, W.B., Ricardo Baeza-Yates, **"Information Retrieval Data Structures and Algorithms",** Prentice Hall, 1992.

E -RESOURCES

1. https://books.google.co.in/books?id=v8CyvsKPdhsCandprintsec=frontcoveranddq=Kowalski,+Gerald+j.Maybury,+Mark+T,+%E2%80%9CInformation+Storage+and+Retrieval+systems+Theory+and+Implementation%22,+2nd+Edition,+2000.andhl=enandsa=Xandved=0ahUKEwiw6PGwmNjTAhWLu48KHXNVAJsQ6AEIITAA#v=onepageandq=Kowalski%2C%20Gerald%20j.Maybury%2C%20Mark%20T%2C%20%E2%80%9CInformation%20Storage%20and%20Retrieval%20systems%20Theory%20and%20Implementation%22%2C%202nd%20Edition%2C%202000.andf=false.
2. https://books.google.co.in/books?id=nsjla44zAfwCandprintsec=frontcoveranddq=Ricardo+Baeza Yates,+%E2%80%9CModern+Information+Retrieval%E2%80%9D,+Pearson+Education,+2007andhl=enandsa=Xandved=0ahUKEwjUrLyymdjTAhWJrY8KHeQCAygQ6AEILDAB#v=onepageandqandf=false
3. www.sciencedirect.com/science/article/pii/S1877050916000739
4. cs.ucy.ac.cy/courses/EPL660/lectures.html

Course Outcomes:

On the successful completion of the course, a student will be able to:

1. Recognize the Boolean Model, Vector Space Model, and Probabilistic Model.
2. Explore the indexing techniques.
3. Apply clustering techniques.
4. Examine visualization technologies and system evaluation methods.
5. Classify Information Retrieval utilities.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech		
Code: 72501	INTRODUCTION TO MINING ENGINEERING (Open Elective)	L	T	P
Credits: 4		3	2	-

Prerequisites: Nil

Course Objectives:
To demonstrate the importance of mining in national economy, understand the terminology associated with the discipline and be familiar with the available regulatory mechanism to enable safe & sustainable mining operations. To know the history of mining and describe the correlation between the development of mining and cultural progress. To introduce the field of mining and provide basic input about mining unit operations. To learn the various modes of access and study the methods of designing the access.

MODULE-I: Introduction to mining engineering and Opening up of deposits [13 Periods]
Introduction to mining engineering: Significance to mining industry in national economy and infrastructure building, basic mining terminologies, stages in mine life cycle, geo-technical investigations, classification of mining methods and their selection criteria. Opening up of deposits: Types, size and location of entries into underground coal and other minerals.

MODULE-II: Shaft sinking operation [13 Periods]
Preliminary geo-technical investigations for a shaft sinking, surface arrangements for sinking shafts and equipment. Methods of sinking shaft in water-logged, pressurized strata in loose and running soils. Mechanized shaft sinking, shaft borers and drop raise method. Need for widening and deepening of operating shafts. Different methods for widening and deepening shafts.

MODULE-III: Development of Workings [12 Periods]
A: Drivage of cross cuts, drifts, inclines and raises by conventional and mechanized methods. Calculation of OMS.
B: Arrangements for ventilations, supports, lightings, transportations and drainages. Drilling patterns for underground coal mines and hard rock mines.

MODULE-IV: Mine Supports [13 Periods]
Mine supports: Types of support: timber, prop, chock/cog, cross bar, concrete, steel and hydraulic supports. Yielding and rigid supports. Fore poling, roof stitching, roof bolting, applicability, advantages and limitations of various supports, Systematic support rule.

MODULE-V: Tunneling Methods [13 Periods]
Conventional method: drilling and blasting method, types of drill patterns, blasting and transportation of muck.
Mechanized method: construction and working principle of tunnel boring machine, applicability, advantages and limitations of tunnel boring machine.
Shield tunneling method: construction and working principle, applicability, advantages and limitations.

TEXT BOOKS:

1. Howard L.Hartman, Jan M.Mutmansky, " **Introductory mining engineering"**, wiley India (P) Ltd.
2. D.J. Deshmukh , "**Elements of mining technology**", Vol-I, Denett & Company .

REFERENCES:

1. Roy Piyush Pal, "**Blasting in ground excavations and mines**", Oxford and IBH, 1st edition, 1993.
2. C.P. Chugh, "**Drilling technology handbook**", Oxford and IBH, 1st edition, 1977.

E RESOURCES:

1. https://www.nap.edu/read/10318/chapter/5#23
2. http://www.alta.eu/commodities/mining-technology/surface-mining/long-distance-belt-conveyors/

Course Outcomes:

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

1. Know the status and significance of mining Industry
2. Know about different methods of Shaft sinking operations
3. Know about Development workings
4. Know about different types of supports, their advantages and disadvantages
5. Know about different tunneling methods.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech		
Code: 7B159	TRAINING AND ORGANISATIONAL DEVELOPMENT (Open Elective)	L	T	P
Credits: 4		3	2	-

PREREQUISITES: NIL

COURSE OBJECTIVE:
To enable the students to understand the design of training, implementation and evaluation of training programs in the organization.

MODULE I: Training in organizations [14 Periods]
Introduction to training: Trends in training, Career opportunities in training, important concepts and meanings, Integrating OD.
Strategy and training, understand motivation and performance, aligning training design with learning process.

MODULE II: Training Need analysis [12 Periods]
Need Analysis and Training design: The Training Need Analysis (TNA) Model, TNA and Design, organizational constraints.
Developing objectives, Facilitation of learning and training transfer to the job, design theory.

MODULE III: Training methods [12 Periods]
A: Introduction to methods of training: Matching methods with outcomes, lectures and demonstrations, games and simulations.
B: Onjob Training, computer based training (CBT).

MODULE – IV: Implementation & Evaluation of Training [12 Periods]
Development of training, implementation, transfer of training, major players in training & development.
Rational for evaluation, resistance to training evaluation, types of evaluation.

MODULE V: Organization Development [14 Periods]
Organisational development- An introduction: Organisational Development – Meaning and Definition, History of OD, Relevance of Organisational Development for Managers, Characteristics of OD, Assumptions of OD.

Change Process and Models: Organisational Change, Strategies for Change, Theories of Planned Change (Lewin's change model, Action research model, the positive model), Action Research as a Process, Resistance to Change.

TEXT BOOKS:
1. Anjali Ghansekar **"Training & Development"** Everest, 2013.
2. G Pandu Naik **"Training & Development"** Excel Books, 2012.

REFERENCES:
1. P.Nick Blanchard, James W. Thacker, A.Anand Ram, **"Effective Training 4e"**, Pearson, 2012.
2. B,Rathan Reddy **" Effective Human Resource Training & Developing Strategy"** Himalaya,2012.
3. Rolf Lynton, Uday Pareek **"Training for Development"** Sage, 2012.

4. P L Rao : HRD Trainer's Handbook of Management Games, Excel, 2013.
5. Pepper, Allan D, **"Managing the Organisational Development function"**, Aldershot, Gower, 1984.

E RESOURCES:

1. https://hr.unm.edu/employee-and-organizational-development
2. http://managementhelp.org/organizationalchange/
3. https://ww2.mc.vanderbilt.edu/vmgtod/
4. http://nptel.ac.in/courses/122105020/9
5. http://nptel.ac.in/courses/122105020/18

Journals : Vikalpa, IIMA, IIMB Review, Decision, IIMC, Vision, HBR.

Course Outcomes:

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

1. Understand the basic concepts of training and development in an organization.
2. Design a training programme with the knowledge of need analysis.
3. Know about the various training methods that are used in organizations.
4. Know the process of implementation and evaluation of training methods.
5. Gain knowledge of various areas of organizational training.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech.		
Code: 70H07	ENGLISH LANGUAGE SKILLS (Open Elective)	L	T	P
Credits: 4		3	2	-

Prerequisite: Nil

Course Objective: To build business English vocabulary and grammar through lessons on the latest topics in the business world and to upgrade the learners communication and presentation skills and make the students competent in communication at an advanced level. In addition to the earlier mentioned, this course gives a room to groom the learners' personality and make the students self-confident individuals by mastering inter-personal skills, team management skills, and leadership skills by giving hands-on experience about business presentations and attending team meetings.

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 [13 Periods]

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 [13 Periods]

Informal and Formal conversation, Verbal and Non - verbal communication. Barriers to effective communication - Kinesics

MODULE III: Reading Skills [13 Periods]

Types of reading–reading for facts, guessing meaning from context, strategies of reading- scanning, skimming, inferring meaning, critical reading.

MODULE IV: Writing and Composition [13 Periods]

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: Writing Skills [12 Periods]

Characteristics of writing – mechanics of writing – methodology of writing – format & style-structures of writing – circular writing – memo writing – instructions writing, Report Writing.

REFERENCE BOOKS:

1. Rajendra Pal S Korlaha ,**Essentials of Business Communication**, Hi: Sultan Chand & Sons, New Delhi.
2. Andrew J. Rutherford , **Basic Communication Skills for Technology**,: Pearson Education Asia, Patparganj, New Delhi-92.
3. V. Prasad, **Advanced Communication skills**, 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. R K Madhukar, **Business Cimmunication**, Vikas Publishing House Pvt Ltd

E-RESOURCES

1. https://blog.udemy.com/types-of-communication/ (Communication Skills)
2. https://www.skillsyouneed.com/ips/conversational-skills.html (Conversation Skills)
3. http://lrs.ed.uiuc.edu/students/jblanton/read/readingdef.htm (Reading Skills)
4. https://www.thoughtco.com/what-is-composition-english-1689893(Writing and composition)
5. http://www.mansfield.edu/fye/upload/Academic-Reading-Skills.pdf (Reading Skills)
6. http://www.journals.aiac.org.au/index.php/IJALEL/article/view/2471 (Writing Skills)
7. https://www.youtube.com/watch?v=cQruENyLNYI&list=PLbMVogVj5nJSZB8BV29_sPwwkzMTYXpaH (Communication Skills)
8. https://www.youtube.com/watch?v=p1-etClsXdk&index=5&list=PLbMVogVj5nJSZB8BV29_sPwwkzMTYXpaH (Conversa**tion Skills)**

Course Outcomes:

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

1. Understand the importance of various forms of non-verbal communication.
2. Participate confidently in business meetings.
3. Gain an understanding about different types of reading skills and employ the same during competitive exams.
4. Recognize the importance of writing in real time situations.
5. Improve the skills necessary to meet the challenge of using English in the business world.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B15	TRANSFORM TECHNIQUES (Open Elective)	L	T	P
Credits: 4		3	2	-

Pre-requisite: Nil

Course Objective: The objective of this course is to familiarize the prospective engineers with techniques in multivariate analysis, some useful special functions. It deals with acquainting the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their profession.

MODULE I: Fourier Series [13 Periods]
Determination of Fourier coefficients, Fourier series, even and odd functions, Half range Fourier sine and cosine expansions. Fourier series in an arbitrary interval - Fourier series for even and odd periodic functions, Half range Fourier sine and cosine expansions.

MODULE II: Fourier Transforms: [13 Periods]
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 III: Z-transforms [12 Periods]
A: Introduction: Definition, Region of convergence, Linearity property, Damping rule, shifting theorems multiplication theorem, initial value theorem, final value theorem.
B: Inverse z-transforms: power series method, partial fraction method, convolution theorem. Application of z-transforms: difference equations.

MODULE IV: Applications of Single Variable & Curve tracing [13 Periods]
Applications of Single Variable Radius, centre and circle of curvature , Evolutes – Envelopes.
Curve tracing in Cartesian, Polar and parametric co-ordinates.

MODULE V: Series Solution of ODE & Integration applications: [13 Periods]
Series Solution of ODE: 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.
Integration applications: Riemann sums, Integral representation for lengths – areas – volumes & surface areas in Cartesian and polar coordinates

TEXT BOOKS:

1. Kreyszig "**Advanced engineering Mathematics"** John Wiley & Sons, 10th Edition, 2010.
2. B.S. Grewal **"Higher Engineering Mathematics"** Khanna Publishers, 43rd Edition, 2014.

REFERENCES:

1. R.K. Jain & S.R.K. Iyengar **"Advanced Engineering Mathematics"** Narosa Publications, 4th edition 2014.
2. Dr.M.D. Raisinghania **" Ordinary and Partial differential Equations** " S. Chand , 18th Edition
3. Tom M Apostle **"Calculus – Volume-I & II**", 2nd Edition, Wiley Publications.

E-RESOURCES

1. https://see.stanford.edu/materials/lsoftaee261/book-fall-07.pdf
2. http://www.gnindia.dronacharya.info/ECE2Dept/Downloads/question_papers/ISem/Engg-Maths1/UNIT-1/Curve-tracing.pdf
3. http://ask.fxplus.ac.uk/tools/HELM/pages/workbooks_1_50_jan2008/Workbook21/21_4_eng_app_z_trnsfms.pdf
4. http://www.maths.surrey.ac.uk/hosted-sites/R.Knott/Fibonacci/fib.html
5. http://tutorial.math.lamar.edu/Classes/DE/SeriesSolutions.aspx

Course Outcomes:

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

1. Understand the applications of Fourier series in signal processing, structural Engg. Etc.,
2. Understand the properties of Fourier Transforms in real time applications in earth quake detection etc.,
3. Understand the properties of Z-Transforms in real time applications in all engineering applications.
4. Understand the application of function of single variables.
5. Understand the series solution of the ordinary differential equations, the Frobenious method and applications of Frobenious Series. Also understands the length of a curve, volume and surface revolution.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B17	**ADVANCED PHYSICS FOR ENGINEERS (Open Elective)**	**L**	**T**	**P**
Credits: 4		3	2	-

Prerequisites: Nil

Course Objective: The objective of this course is to make the students familiar with the recent advanced concepts in physics

MODULE I: Special Theory of Relativity: [13 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 [13 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 [14 Periods]
A: Synthesis Introduction, Deposition techniques-Pulsed Laser Deposition (PLD), Spray Pyrolysis; Nucleation and growth of the thin films, properties (Mechanical, Electrical, Magnetic and Optical).
B: Characterization 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 [12 Periods]
Important features of photonic crystals, Presence of photonic band gap, anomalous group velocity dispersion, Micro cavity, 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 [12 Periods]
Single, poly and amorphous silicon, GaAs, CdS, Cu2S, CdTe; Origin of photovoltaic effect, Homo and hetero junction, working principle of solar cell, Evaluation of Solar cell parameters, I-V, C-V and C-f characteristics.

TEXT 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.

REFERENCES:

1. R F Bun shah, "**Hand Book of Technologies for Films and coating",** Noyes publishers, 1st Edition, 1996.
2. B E A Saleh and A C Tech, "**Fundamentals of Photonics",** John Wiley and Sons**,** New

York, 1st Edition, 1993.
3. K L Chopra and S R Das, "**Thin film Solar Cells",** Plenum press, 1st Edition 1983**.**
4. K Vijaya Kumar, T Sreekanth and S Chandralingam, "**Engineering Physics",** S Chand and Co 1st Edition, 2008.

E-RESOURCES:

1. http://physics.mq.edu.au/~jcresser/Phys378/LectureNotes/SpecialRelativityNotes.pdf
2. http://www.kfupm.edu.sa/centers/CENT/AnalyticsReports/KFUPM-TFSC-Dec20.pdf
3. https://www.journals.elsevier.com/solar-energy-materials-and-solar-cells
4. https://www.journals.elsevier.com/journal-of-alloys-and-compounds/
5. http://aip.scitation.org/journal/apl
6. http://nptel.ac.in/courses/115101011/
7. http://nptel.ac.in/courses/117103066/11
8. https://www.youtube.com/watch?v=JygZofoFNfE

Course Outcomes:

After completion of this course, students will be able to

1. Be aware of the concepts of special theory of relativity.
2. Analyze the basic concepts of Holography and applications.
3. Acquire the knowledge on synthesis methods of thin films and their characterization techniques.
4. Develop basic knowledge on the photonic crystals
5. Apply the basic concepts of solar cell physics.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B20	CHEMISTRY OF ENGINEERING MATERIALS (Open Elective)	L	T	P
Credits: 4		3	2	-

Pre-requisite: Nil

Course Objective: 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 [13 Periods]

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 [13 Periods]

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 [13 Periods]

A: Introduction-Classification of cement-natural –chemical composition of cement-portland cement-chemical reactions involved in setting and hardening of cement.

B: 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 [13 Periods]

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 [12 Periods]

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.

TEXT BOOKS:

1. P.C.Jain and Monica Jain, "**A text Book of Engineering Chemistry"**, DhanpatRai Publications, New Delhi, 12th Edition 2006.
2. M.Thirumala Chary and E.Laxminarayana, **"Engineering Chemistry"** by SciTech publications (INDIA) PVT Ltd, Third Edition,2016.

REFERENCE BOOKS:

1. B.Rama Devi, Ch.Venkata Ramana Reddy and Prasantha Rath**,"Text Book of Engineering chemistry"** by Cengage Learning India Pvt.Ltd,2016.
2. F.W. Billmeyer, "**Text Book of Polymer Science"**, John Wiley & Sons, 4th Edition, 1996.

3. M.G. Fontana, N. D. Greene, "**Corrosion Engineering"**, McGraw Hill Publications, New York, 3rd Edition, 1996.
4. B.R.Puri,L.R.Sharma&M.S.Pathania,"**Principles of Physical Chemistry",** S.Nagin Chand &Co., New Delhi, 23rd Edition, 1993.
5. G.A.Ozin and A.C. Arsenault,"**Nanochemistry: A Chemical Approach to Nanomaterials**", RSC Publishing, 3rd Edition, 2005.

E RESOURCES

1. www.istl.org/02-spring/internet.html (Basics on materials)
2. https://books.google.co.in/books?id=J_AkNu-Y1wQC (fuels and lubricants hand book)
3. Journal of materials science (Springer publishers)
4. Journal of materials science and technology (Elsevier publishers)
5. nptel.ac.in/courses/105102012/ (Cement concret technology)
6. nptel.ac.in/courses/112102015/22 (lubricants)

Course Outcomes

After completion of the course, students will be able to

1. Interpret the vitality of phase rule in metallurgy and application of phase rule to one and two component systems.
2. Students know the usage of lubricants in different temperature conditions.
3. The immense importance of basic constructional material, Portland cement in Civil Engineering works.
4. To acquire the knowledge about properties and applications of glass, ceramics and refractories.
5. Students will know vulcanization of rubber, bio-degradable polymers and liquid crystals.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70103	SURVEYING (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course 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, the field applications and concepts of leveling survey.

MODULE I: Introduction to Basic Concepts **[09 Periods]**

Introduction, Objectives, classifications and Principles of surveying, Scales, Shrinkage of maps, conventional symbols and code of signals, Surveying Accessories, phases of surveying.

MODULE II: Plane Table Survey **[10 Periods]**

Instruments employed in plane table survey. Use and adjustment of these instruments including simple alidade. Setting up of the table, Various methods of plane table survey: Radiation method of plane tabling, Intersection or triangulation method of plane tabling, Traversing method of plane tabling, Resection method of plane tabling. Three point and two point problems, errors in plane table survey. Advantages and disadvantages of plane tabling.

MODULE III: Measurement of Distances and Directions: **[10 Periods]**

A. Linear Distances: Approximate methods, direct methods-chains – tapes, ranging- tape corrections, indirect methods- optical methods –E.D.M methods.

B. Prismatic Compass: Bearings Included Angles, Local Attraction, Magnetic Declination and Dip.

MODULE IV: Leveling and Contouring **[09 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,

Characteristics and Uses of contours, Direct and indirect methods of contour surveying, interpolation and sketching of Contours.

MODULE V: Computation of Areas and Volumes **[10 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.

TEXT BOOKS:

1. B.C.Punmia Ashok 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. Arora K R "**Surveying Vol 1, 2 & 3"**, Standard Book House, Delhi, 15th Edition, 2015
2. Chandra A M, "**Plane Surveying**", New age International Pvt. Ltd., Publishers, New Delhi, 3rd Edition 2015.

3. Chandra A M, "**Higher Surveying**", New age International Pvt. Ltd., Publishers, New Delhi, 3rd Edition 2015.

E RESOURCES

1. http://www.whycos.org/fck_editor/upload/File/Pacific
2. http://nptel.ac.in/courses/105107122/
3. https://www.youtube.com/watch?v=chhuq_t40rY

Course Outcomes:

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

1. Apply basic geometry to detect difference in plane and arc distance over "spherical" earth surface for typical length survey projects.
2. Identify the importance of the compass survey and its practical applications.
3. Apply basic methods and applications of plane Table survey.
4. Identify the field applications and concepts of leveling survey.
5. Identify the different methods of calculation of area, contouring and measurement of volumes.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70150	GREEN BUILDINGS (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisite: Nil

Course Objective: 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: **[09 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: **[10 Periods]**

A: Building energy system strategies, Water cycle strategies, Materials selection strategies, Indoor Environmental Quality [IEQ]

B: Analysis and strategies, Construction, team responsibilities and controls, Building commissioning strategies

MODULE IV: **[09 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, Case Study on green buildings, Net Zero Energy Buildings, Sustainable Constructions in civil Engineering.

TEXT BOOKS:

1. Abe Kruger and Carl Seville, **" Green Building, Principles and Practices in Residential Construction**", Cengage Publications, 1st edition, 2012.
2. Ross Spiegel, Dru Meadows, **"Green Building Materials: A Guide to Product Selection and Specification"**, 3rd Edition, 2010.

REFERENCES:

1. Charles J. Kibert, **"Sustainable Construction: Green Building Design and Delivery**", 2012.

E RESOURCES:

1. http://www.ncrec.gov/Pdfs/bicar/GreenBuilding.pdf

Course Outcomes:

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

1. Identify green building materials and their sources.
2. Understand the construction process of green buildings and their benefits quality, healthy and safe environments.
3. Learn the strategies to construct green buildings.
4. Identify the issues a raised due to construction of green buildings.
5. Gain knowledge on the case studies of green buildings.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70227	ENERGY AUDIT AND CONSERVATION (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives: This course deals about the concept of energy conservation, energy management and different approaches of energy conservation in industries, economic aspects of energy conservation project and energy audit in commercial and industrial sector.

MODULE I: Basic Principles of Energy Audit [9 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 [9 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 [10 Periods]

A: Energy efficient motors, factors affecting efficiency, loss distribution, constructional details.
B: 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 [10 Periods]

Power Factor Improvement, Lighting: Power factor – Methods of improvement, location of capacitors, Pf with non linear loads, effect of harmonics on power factor. Power factor 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 [10 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. W.R. Murphy and G. Mckay, **"Energy Management",** Butter Worth Publications.
2. John. C. Andreas, **"Energy Efficient Electric Motors",** Marcel Dekker Inc Ltd, 2nd Edition, 1995.

REFERENCES

1. Paul O' Callaghan, **"Energy Management",** Mc-Graw Hill Book Company, 1st Edition, 1998.
2. W.C.Turner, **"Energy Management Hand Book",** A John Wiley and Sons.
3. S. C. Tripathy, "**Utilization of Electrical Energy**", Tata McGraw Hill, 1993.
4. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online).

5. L.C. Witte, P.S. Schmidt and D.R.Brown, **"Industrial Energy Management and Utilization",** Hemisphere Publication, Washington, 1998.

E - RESOURCES

1. http://industrialelectricalco.com/wp-content/uploads/2014/01/Understanding-Energy-Efficient-Motors-EASA.pdf
2. https://beeindia.gov.in/
3. https://beeindia.gov.in/sites/default/files/3Ch10.pdf

Course Outcomes

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

1. Examine the principles of Energy audit and its process in thermal power station, industries.
2. Analyze the different aspects of energy management.
3. Describe the characteristics of energy efficient motors.
4. Illustrate the power factor improvement, good lighting system practice and the types of energy instruments
5. Analyze the economic aspects of Energy Management.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70240	ENERGY STORAGE SYSTEMS (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives: This course deals with the need for electrical energy storage, different electrical storage technologies, types and features of energy storage systems and the applications of electrical energy storage.

MODULE I: ELECTRICAL ENERGY STORAGE TECHNOLOGIES 10 Periods

Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

MODULE II: NEEDS FOR ELECTRICAL ENERGY STORAGE 10 Periods

Emerging needs for EES, More renewable energy, less fossil fuel, Smart Grid uses. The roles of electrical energy storage technologies, The roles from the viewpoint of a utility, The roles from the viewpoint of consumers, The roles from the viewpoint of generators of renewable energy.

MODULE III: FEATURES OF ENERGY STORAGE SYSTEMS 10 Periods

A: Classification of EES systems, Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheel energy storage (FES).

B: Electrochemical storage systems, Secondary batteries, Flow batteries, Chemical energy storage, Hydrogen (H2), Synthetic natural gas (SNG).

MODULE IV: TYPES OF ELECTRICAL ENERGY STORAGE SYSTEMS 9 Periods

Electrical storage systems, Double-layer capacitors (DLC), Superconducting magnetic energy storage (SMES), Thermal storage systems, Standards for EES, Technical comparison of EES technologies.

MODULE V: APPLICATIONS 9 Periods

Present status of applications, Utility use (conventional power generation, grid operation & service) , Consumer use (uninterruptable power supply for large consumers), New trends in applications ,Renewable energy generation, Smart Grid, Smart Micro grid, Smart House, Electric vehicles, Management and control hierarchy of storage systems, Internal configuration of battery storage systems, External connection of EES systems , Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA– aggregation of many dispersed batteries.

TEXT BOOKS

1. James M. Eyer, Joseph J. Iannucci and Garth P. Corey, **"Energy Storage Benefits and Market Analysis"**.
2. **"The Electrical Energy Storage",** IEC Market Strategy Board.

REFERENCES

1. Jim Eyer, Garth Corey, **"Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide, Report",** Sandia National Laboratories, Feb 2010.

E - RESOURCES

1 http://nptel.ac.in/courses/108105058/

2 http://www.nptel.ac.in/courses/108103009/pdf/lec33.pdf

Course Outcomes

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

1. Understand the different types of electrical energy storage technologies.
2. Learn about the need for electrical energy storage.
3. Comprehend the various features energy storage systems.
4. Understand the various types of electrical energy storage systems.
5. Emphasize the various applications of electrical energy storage.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code:70347	RENEWABLE ENERGY SOURCES (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

The objective of this subject is to provide knowledge about different non-conventional energy sources.

MODULE I: Principles of Solar Radiation [10 Periods]

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 [10 Periods]

Solar Collectors: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

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 [10 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 [09 Periods]

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India. 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 [09 Period]

Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thomson effects, 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 of Faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS

1. G.D. Rai, "**Non-Conventional Energy Sources",** Khanna publishers , 2011.
2. Tiwari and Ghosal, "**Renewable Energy Resources"**, Narosa Publishing House, 2007.

REFERENCES

1. Twidell& Weir, "**Renewable Energy Sources",** Taylor and Francis Group Publishers-2015.
2. Sukhatme, **"Solar Energy",** McGraw-Hill-third edition-2008
3. B.S Magal Frank Kreith& J.F Kreith "**Solar Power Engineering",** McGraw-Hill Publications-2010.
4. Frank Krieth& John F Kreider, "**Principles of Solar Energy",** McGraw-Hill-1981.
5. Ashok V Desai,"**Non-Conventional Energy**", New International (P) Limited-2003.

E - RESOURCES

1. nptel.ac.in/courses/112105051/
2. https://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf
3. faculty.itu.edu.tr/onbasiogl1/DosyaGetir/62002
4. https://www.journals.elsevier.com/renewable-energy/
5. www.ijrer.org

Course Outcomes

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

1. Understand the principles of solar radiation
2. Recognize solar collectors, Solar energy storage and its applications
3. Classify the harvesting of wind energy & bio-mass energy.
4. Understand the harvesting of geothermal energy & ocean energy.
5. Apply the direct energy conversion methods

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70351	TOTAL QUALITY MANAGEMENT (Open Elective)	L	T	P
Credits:3		3	-	-

Prerequisites: Nil

Course Objectives:

To give the students an overview of quality and TQM and explaining the salient contributions of Quality Gurus like Deming, Juran and Crosby and general barriers in implementing TQM and also get basic knowledge about ISO.

MODULE I: Introduction [10 Periods]

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, and Customer retention - Costs of quality.

MODULE II: TQM Principles [10 Periods]

Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

MODULE III: Statistical Process Control (SPC) [10 Periods]

A: Statistical fundamentals – Measures of central Tendency and Dispersion - Population and Sample.

B: Control Charts for variables and attributes, Industrial Examples. Process capability. Concept of six sigma – New seven Management tools.

MODULE IV: TQM Tools [9 Periods]

Bench marking -Reason to bench mark, Bench marking process - FMEA - Stages, Types. Quality Function Deployment (QFD) - House of Quality - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures

MODULE V: Quality Systems [9 Periods]

Need for ISO 9000 and Other Quality Systems - ISO 9000-2008 Quality System - Elements, Implementation of Quality System Documentation, Quality Auditing - QS 9000 - ISO 14000 - ISO 18000, ISO 20000, ISO 22000 TS 16949, ISO 14000, AS9100– Concept, Requirements and benefits – case studies.

TEXT BOOKS

1. Dale H. Besterfiled, "Total Quality Management", Third Edition, Pearson Education Asia, Indian Reprint, 2010.
2. Subburaj Ramasamy“ Total Quality Management” Tata Mcg raw hill edition, 2012.

REFERENCES

1. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2011.
2. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.
3. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.
4. Dr S. Kumar, “Total Quality Management”, Laxmi Publications Ltd., New Delhi 2015.
5. P. N. Muherjee, “Total Quality Management”, Prentice Hall of India, New Delhi, 2006.
6. Poornima M. Charantimath “Total Quality Management” Pearson publications,2011.

E - RESOURCES

1. https://src.alionscience.com/pdf/RAC-1ST/SOAR7_1st_Chapter.pdf
2. https://onlinecourses.nptel.ac.in/noc17_mg18
3. nptel.ac.in/courses/122106032/Pdf/4_2.pdf
4. www.thecqi.org
5. www.emeraldinsight.com/journal/tqm
6. www.emeraldinsight.com/doi/pdf/10.1108/09544789710367712
7. www.statit.com/statitcustomqc/StatitCustomQC_Overview.pdf

Course outcomes

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

1. Gain basic knowledge in total quality management relevant to both manufacturing and service industry
2. Implement the basic principles of TQM in manufacturing and service based organization.
3. Apply various SPC tools in real time manufacturing and service industry
4. Implement various TQM tools like FMEA & QFD.
5. Apply various ISO Standards for real time applications

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70430	DIGITAL DESIGN USING VERILOG HDL (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives: This course introduces the concepts associated with understanding of VLSI Design flow and Verilog language constructs, the Gate level ,behavioral ,switch level and dataflow design descriptions of verilog and also the sequential circuits modeling using verilog and Testing methods.

MODULE I: Introduction to Verilog HDL [8 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 [10 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 [10 Periods]

A: 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,

B: 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 [10 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 [10 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.
2. Zainalabdien Navabi, **"Verilog Digital System Design"**, TMH, 2nd Edition, 1999.

REFERENCES:

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.

E-RESOURCES:

1. https://www.tutorialspoint.com/vlsi_design/vlsi_design_verilog_introduction.htm
2. http://www.asic-world.com/verilog/first1.html
3. https://doaj.org/article/4f07787948ce4bfc9c468f1cbcf9e190
4. http://nptel.ac.in/courses/106105083/

Course Outcomes:

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

1. Understand overview of Verilog HDL programming and its language constructs.
2. Write Verilog HDL Program for Gate level modeling and dataflow modeling of digital circuits.
3. Understand behavioral modeling constructs and can able to write Verilog HDL program with behavioral modeling.
4. Write Verilog Program for MOS transistors circuits using switch level modeling and also understand usage of system Tasks.
5. Write Verilog Program for sequential circuit which modeled in state machine and understand the concept of Test Bench techniques for digital design verification.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70438	SATELLITE COMMUNICATIONS (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

The objective of the course is to prepare students to excel in basic knowledge of satellite communication principles by providing the students a solid foundation in orbital mechanics and launches for the satellite communication. The course aims at offering the students a basic knowledge of link design of satellite with design examples, a better understanding of multiple access systems and earth station technology and sufficient knowledge in satellite navigation, GPS and satellite packet communications.

MODULE I: Communication Satellite: Orbit and Description [09 periods]

A Brief history of satellite Communication, Satellite Frequency Bands, Satellite Systems, Applications, Orbital Period and Velocity, effects of Orbital Inclination, Azimuth and Elevation, Coverage angle and slant Range, Eclipse, Orbital Perturbations, Placement of a Satellite in a Geo-Stationary orbit.

MODULE II: Satellite Sub-Systems and Satellite Link [10 periods]

Satellite Sub-Systems:

Attitude and Orbit Control system, TT&C subsystem, Attitude Control subsystem, Power systems, Communication subsystems, Satellite Antenna Equipment.

Satellite Link:

Basic Transmission Theory, System Noise Temperature and G/T ratio, Basic Link Analysis, Interference Analysis, Design of satellite Links for a specified C/N, (With and without frequency Re-use), Link Budget.

MODULE III: Propagation Effects and Multiple Access [10 periods]

A: Propagation Effects:

Introduction, Atmospheric Absorption, Cloud Attenuation, Tropospheric and Ionospeheric Scintillation and Low angle fading, Rain induced attenuation, rain induced cross polarization interference.

B: Multiple Access:

Frequency Division Multiple Access (FDMA) – Inter modulation, Calculation of C/N, Time Division Multiple Access (TDMA) - Frame Structure, Burst Structure, Satellite Switched TDMA, On-board Processing, Demand Assignment Multiple Access (DAMA) – Types of Demand Assignment, Characteristics, CDMA Spread Spectrum Transmission and Reception.

MODULE IV: Earth Station Technology, Satellite Navigation and Global Positioning Systems [10 periods]

Earth Station Technology:

Transmitters, Receivers, Antennas, Tracking Systems, Terrestrial Interface, Power Test Methods, Lower Orbit Considerations.

Satellite Navigation and Global Positioning Systems:

Radio and Satellite Navigation, GPS Position Location Principles, GPS Receivers, GPS C/A Code Accuracy, Differential GPS.

MODULE V: Satellite Packet Communications [09 periods]

Message Transmission by FDMA: M/G/1 Queue, Message Transmission by TDMA, PURE ALOHA-Satellite Packet Switching, Slotted Aloha, Packet Reservation, Tree Algorithm.

TEXT BOOKS:

1. Timothy Pratt, Charles Bostian, Jeremy Allnutt, **" Satellite Communications**", John Wiley & Sons, 2nd Edition, 2003.

2. Wilbur, L. Pritchand, Robert A. Nelson and Heuri G. Suyderhoud, **"Satellite Communications Engineering**", Pearson Publications, 2nd Edition.

REFERENCES:

1. Dennis Roddy, "**Satellite Communications**", Tata Mc.Graw Hill, 2nd Edition, 1996.
2. M. Richcharia, "**Satellite Communications**: **Design Principles**", 2nd Ed., BSP, 2003.
3. Tri.T.Ha, **" Digital Satellite Communications**", Tata Mc.Graw Hill, 2nd Edition, 1990.
4. K. N. Raja Rao **, "Fundamentals of Satellite Communications",** PHI, 2004.

E-RESOURCES:

1. https://www.britannica.com/technology/satellite-communication
2. http://www.radio-electronics.com/info/satellite/communications_satellite/satellite-communications-basics-tutorial.php
3. https://www.nasa.gov/directorates/heo/scan/communications/outreach/funfacts/txt_satellite_comm.html
4. http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1542-0981
5. http://www.inderscience.com/jhome.php?jcode=ijscpm
6. http://nptel.ac.in/courses/117105131/

Course Outcomes:

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

1. Understand the historical background, basic concepts and frequency allocations for satellite communication.
2. Demonstrate orbital mechanics, launch vehicles and launchers.
3. Demonstrate the design of satellite links for specified C/N with system design examples.
4. Visualize satellite sub systems like Telemetry, tracking, command and monitoring power systems etc.
5. Understand the various multiple access systems for satellite communication systems and satellite packet communications.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70539	ANDROID APPLICATION DEVELOPMENT (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objectives:

This course aims the students to learn the essentials of mobile apps development, aids in developing simple android applications, identify the essentials of android design, file settings, study about user interface design and develop android APIs.

MODULE I: Mobile and Information Architecture [09 Periods]

Introduction to Mobile - A brief history of Mobile, The Mobile Eco system, Why Mobile? Types of Mobile Applications.

Mobile Information Architecture - Mobile Design, Mobile 2.0, Mobile Web development, Small Computing Device Requirements.

MODULE II: Introduction to Android and Installation [09 Periods]

Introduction to Android - History of Mobile Software Development, The Open Handset Alliance-Android platform differences.

Android Installation - The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building a Sample Android application.

MODULE III: Android Application Design and Settings [10 Periods]

A: Android Application Design Essentials - Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents.

B: Android File Settings - Android Manifest File and its common settings, Using Intent Filter, Permissions, Managing Application resources in a hierarchy, working with different types of resources.

MODULE IV: Android UID and Techniques [10 Periods]

Android User Interface Design - Essentials User Interface Screen elements, Designing User Interfaces with Layouts.

Animation Techniques - Drawing and Working with Animation- Drawing on the screen –Working with Text-Working with Bitmaps-Working with shapes-Working with animation.

MODULE V: Android APIs-I & APIs-II [10 Periods]

Android APIs-I - Using Common Android APIs Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data between Applications with Content Providers.

Android APIs-II - Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

TEXT BOOKS

1. James Keogh, **"J2ME: The Complete Reference"**, Tata McGrawHill.
2. Lauren Darcey and Shane Conder, **"Android Wireless Application Development",** Pearson Education, 2nd edition, 2011.

REFERENCES

1. Reto Meier, **"Professional Android 2 Application Development",** Wiley India Pvt Ltd.
2. Mark L Murphy, **"Beginning Android"**, Wiley India Pvt Ltd.
3. Barry Burd, **"Android Application Development All in one**", 1st edition, Wiley India Pvt Ltd.

E-RESOURCES:

1. http://onlinevideolecture.com/ebooks/?subject=Android-Development
2. https://developer.android.com/training/basics/firstapp/index.html
3. IEEE Transactions on Mobile Computing
4. International Journal of Interactive Mobile Technologies
5. http://nptel.ac.in/courses/106106147/

Course Outcomes

On successful completion of the course, a student will be able to:

1. Classify different types of Platforms.
2. Appreciate the Mobility landscape.
3. Familiarize with Mobile apps development aspects.
4. Design and develop mobile apps, using Android as development platform, with key focus on user experience design, native data handling and background tasks and notifications.
5. Perform testing, signing, packaging and distribution of mobile apps.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70544	SOFTWARE PROJECT MANAGEMENT (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:

This Course will enables the students to understand the conventional software management and necessary methods for improve software economics, define software project management principles, life cycle, artifacts, to understand and explain process work flows, checkpoints of process, iterative planning, learn and solve process automation, project process instrumentation and control, metrics, tailoring the process, analyze and evaluate project organization responsibilities, management and case studies.

MODULE I: Conventional Software Management and Software Economics [10 Periods]

Conventional Software Management - The waterfall model, conventional software management performance, Overview of project planning – stepwise project planning.

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

MODULE II: Phases and Process [10 Periods]

The Old and New Way - The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

Life Cycle Phases - Engineering and production stages, Inception, Elaboration, Construction, Transition phases.

Artifacts of the Process - The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

MODULE III: Software Process and Process Planning [09 Periods]

A: Work Flows and Checkpoints of the Process - Software process workflows, Iteration workflows, Major mile stones, Minor Milestones, Periodic status assessments

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

MODULE IV: Process Automation and Instrumentation [09 Periods]

Process Automation - Automation Building blocks.

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

Tailoring the Process - Process discriminates.

MODULE V: Project Organizations and Future SPM [10 Periods]

Project Organizations and Responsibilities - Line-of-Business Organizations, Understanding Behavior – Organizational Behavior.

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

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

TEXT BOOKS

1. Walker Royce, **"Software Project Management",** Pearson Education, 2005.

2. Bob Hughes and Mike Cottrell, "**Software Project Management**", Tata McGraw Hill Education, 5th Edition, 2010.

REFERENCES

1. Joel Henry, "**Software Project Management, A Real -World Guide to Success**", Pearson Education, 3rd Edition, 2009.
2. Pankaj Jalote, " **Software Project Management in Practice**", Addison- Wesley, 2002.

E-RESOURCES

1. https://books.google.co.in/books?isbn=0201309580
2. https://books.google.co.in/books?isbn=0070706530
3. http://www.uta.fi/sis/reports/index/R31_2014.pdf
4. http://nptel.ac.in/courses/106101061/18
5. http://nptel.ac.in/courses/106101061/29#

Course Outcomes:

On the successful completion of the course, a student will be able to:

1. Identify the conventional software management planning.
2. Demonstrate the principles of conventional software Engineering, Life cycle Phases, and Artifacts of the process.
3. Apply Work Flows, Checkpoints of the process and Iterative Process Planning.
4. Evaluate metrics for tailoring the process.
5. Design and Apply project responsibilities and analyze various case studies.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70605	ADVANCED JAVA PROGRAMMING (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Java Programming

Course Objectives:

This course provides the students a clear understanding of analyzing the way of transportation of data using XML and the significance of Java Bean, develop dynamic web applications using Servlets, build a web application which connects to database and interpret the importance of JSP over Servlets.

MODULE I: Introduction to XML **[08 Periods]**

Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

MODULE II: Introduction to Advanced Java and Java Beans **[10 Periods]**

Advanced Java- Java Swing package: use of System class, Applet Context, signed applet, object serialization, shallow and deep copying, Java collections: Iterators, Array Lists, sets, hash set, hash table, queue, priority queue, class-vector, class- comparable interface.

Java Beans- Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API, Introduction to EJB's.

MODULE III: Introduction to Servlets and Servlet Programming **[10 Periods]**

A: Introduction to Servlets- Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax. Servlet Package.

B: Servlet Programming - Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request and Responses, Using Cookies-Session Tracking, Security Issues.

MODULE IV: Database and JSP **[10 Periods]**

Database Access -Database Programming using JDBC, JDBC drivers, Studying Javax.sql
.* package, Accessing a Database from a Servelet. Prepared Statements.

Introduction to JSP- The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment.

MODULE V: JSP Application Development **[10 Periods]**

Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing: Displaying Values Using an Expression, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations, Accessing a Database from a JSP page, Deploying JAVA Beans in a JSP Page, Introduction to struts framework.

TEXT BOOKS:

1. Dietel and Nieto, **"Internet and World Wide Web – How to program",** PHI/Pearson Education Asia.
2. Patrik Naughton, Herbert Schildt, "**The Complete Reference, Java",** Third Edition, TMH.
3. Marty Hall and Larry Brow, "**Core servlets and java server pages volume 1: core technologies",** Pearson.

REFERENCES:

1. Paul S. Wang, Sanda Katila.Thomson**, "An Introduction to Web Design and Programming",** Course Technology Inc Publications, 2003.
2. Jon Duckett, Wrox, , "**Beginning Web Programming**", wiley India Pvt. Ltd., 2008.

E -RESOURCES

1. http://xml.coverpages.org/xtml.html
2. https://www.tutorialspoint.com/html/
3. https://www.javatpoint.com/servlet-tutorial
4. https://ndl.iitkgp.ac.in/result?q={%22t%22:%22search%22,%22k%22:%22web%20technologies%22,%22s%22:[],%22b%22:{%22filters%22:[]}}
5. http://nptel.ac.in/courses/106105084/

Course Outcomes:

On the successful completion of the course, a student will be able to:

1. Understand the role of XML in web programming.
2. Develop applications using Java Beans.
3. Build dynamic web applications using Servlets.
4. Demonstrate how an application can connect to a database.
5. Illustrate the importance of JSP in web programming.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70621	MANAGEMENT INFORMATION SYSTEM (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:
This course enables the students to evaluate the role of the major types of information systems in a business environment and their relationship to each other, assess the impact of the Internet, Internet technology on business electronic commerce, electronic business, identify the major management challenges to building, using information systems and learn how to find appropriate solutions to those challenges.

MODULE I: Information system development [10 Periods]
Information System- Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development.
Systems Development - User role in Systems Development Process – Maintainability and Recoverability in System Design.

MODULE II: Representations and Analysis [10 Periods]
Models for Representing Systems- Mathematical, Graphical and Hierarchical (Organization Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics.
Analysis of System Structure - Decomposition and Aggregation – Information Architecture – Application of System Representation to Case Studies.

MODULE III: Information and decision theory [10 Periods]
A: Information Theory: Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Inferences and Uncertainty.
B: Decision Theory: Identifying Information needed to Support Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

MODULE IV: Role of IT in information system [9 Periods]
Information System Application- Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning.
Use of Information Technology- Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

MODULE V: Information system development [9 Periods]
Development of Information Systems-I- Systems analysis and design – System development life cycle – Limitation – End User.
Development of Information Systems-II- Managing End Users – off– the shelf software packages – Outsourcing – Comparison of different methodologies.

TEXT BOOKS:
1. Laudon K.C, Laudon J.P, Brabston M.E, "**Management Information Systems -Managing the digital firm**", Pearon Education, 2004.

REFERENCES:

1. Turban E.F, Potter R.E, "**Introduction to Information Technology**";Wiley, 2 004.
2. Jeffrey A.Hoffer, Joey F.George, Joseph S. Valachich, "**Modern Systems Analysis and Design**", Third Edition, Prentice Hall, 2002.

E -RESOURCES

1. http://iefb.weebly.com/uploads/1/4/2/4/14240576/libri_per_msi.pdf
2. http://www.aabri.com/manuscripts/10736.pdf
3. http://www.nptelvideos.in/2012/11/management-information-system.html

Course Outcomes:

On the successful completion of the course, a student will be able to:

1. Understand the processes of developing and implementing information systems.
2. Analyze various Representations and analysis of system structure.
3. Comprehend the techniques in information theory and decision theory.
4. Implement various applications in Information Systems.
5. Deploy information systems suitable for end users.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech		
Code: 72504	DRILLING AND BLASTING (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:
To understand the principles and mechanism of different drilling methods, novel drilling techniques. To learn the basic mechanism of rock fragmentation by blasting. To know the various types of explosives and accessories used in blasting. To learn the different methods of blasting adopted in surface and underground coal / non-coal mines including adverse effects of blasting & their control

MODULE-I: Principles of Drilling and Drill bits [9 Periods]
Principles of drilling: Principles of rock drilling, drillability, drillability index, factors affecting the drillability, selection of drills.
Drill Bits: Various types of drill bits, study of bit life, factors affecting bit life, Thrust feed and rotation

MODULE-II: Explosives [10 Periods]
Historical development, properties of explosives, low and high explosives, ANFO, slurries, Emulsion explosives, heavy ANFO, permitted explosives, testing of permitted explosives, bulk explosive systems-PMS, SMS, substitutes for explosives and their applications- hydrox, cardox, airdox.

MODULE-III: Firing of Explosives and blasting methods [10 Periods]
A: Firing of Explosives: Safety fuse, detonating cord and accessories, detonators, Exploders, Electric firing and non-electric firing, electronic detonators, NONEL blasting.
B: Blasting methods: Preparation of charge, stemming and shot firing, choice and economical use of explosives, misfires, blown out shots, incomplete detonation, their causes, prevention and remedies.

MODULE-IV: Handling of Explosives [9 Periods]
Surface and underground transport of explosives, storage and handling of explosives, magazines, accidents due to explosives, precautions and safety measures during transportation.

MODULE-V: Mechanics of blasting and effects of blasting [10 Periods]
Mechanics of blasting: Factors affecting rock breakage using explosives, theory of shaped charge, detonation pressure, coupling, shock waves impedance, critical diameter.
Effects of blasting: Vibrations due to blasting and damage criteria, fly rocks, dust, fumes, water pollution and controlled blasting.

TEXT BOOKS:

1. Blasting in ground excavations and mines, Roy Pijush Pal, Oxford and IBH, 1st ed 1993
2. Drilling technology handbook, C.P. Chugh, Oxford and IBH, 1st ed, 1977 .

REFERENCE BOOKS:

1. Rock blasting effect and operation, Roy Pijush Pal, A.A. Balkema, 1st ed, 2005
2. Elements of mining technology, Vol-1, D.J. Deshmukh, Central techno, 7th ed, 2001
3. Blasting operations, B.Hemphill Gary, Mc-graw Hill, 1st ed 1981
4. Explosive and blasting practices in mines, S.K.Das, Lovely prakashan, 1st ed, 1993.

E RESOURCES:

1. http://technology.infomine.com/reviews/blasting/welcome.asp?view=full
2. https://miningandblasting.wordpress.com/list-of-technical-papers/

Course Outcomes:

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

1. Understand Principles of drilling and Various types of drill bits
2. Understand different types of Explosives
3. Understand Firing of Explosives and Blasting methods
4. Understand Handling of Explosives
5. Understand Mechanics of blasting and effects of blasting

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech		
Code: 72543	TUNNELING ENGINEERING (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objectives:
The course enables the students to be familiar with the recent developments in various technologies used in underground spaces includes tunneling and cavern projects across the world.

MODULE I: Introduction [10 Periods]
Scope and application, historical developments, art of tunneling, tunnel engineering, future tunneling considerations. Types of Underground Excavations: Tunnel, adit, decline, shaft; parameters influencing location, shape and size; geological aspects; planning and site investigations.

MODULE II: Tunnel Excavations [10 Periods]
Tunneling Methods: Types and purpose of tunnels; factors affecting choice of excavation technique; Methods - soft ground tunneling, hard rock tunneling, shallow tunneling, deep tunneling; Shallow tunnels – cut and cover, cover and cut, pipe jacking, jacked box excavation techniques, methods of muck disposal, supporting, problems encountered and remedial measures.

MODULE III: Drilling and Blasting [10 Periods]
A. Drilling - drilling principles, drilling equipment, drill selection, specific drilling, rock drillability factors; Blasting - explosives, initiators, blasting mechanics,
B. Types of cuts- fan, wedge and others; blast design, tunnel blast performance - powder factor, parameters influencing, models for prediction; mucking and transportation equipment selection.

MODULE IV: Mechanization [9 Periods]
Tunneling by Road headers and Impact Hammers: Cutting principles, method of excavation, selection, performance, limitations and problems. Tunneling by Tunnel Boring Machines: Boring principles, method of excavation, selection, performance, limitations and problems; TBM applications.

MODULE V: Tunnel Services [9 Periods]
Supports in Tunnels: Principal types of supports and applicability. Ground Treatment in Tunneling: Adverse ground conditions and its effect on tunneling; Excavation of large and deep tunnels, caverns. Tunnel Services: Ventilation, drainage and pumping; Tunneling hazards.

TEXT BOOKS:

1. Hudson, J.A., Rock Engineering Systems – Theory and practice, Ellis Horwood, England.
2. Clark, G.B., (1987), Principles of Rock Fragmentation, John Wiley and Sons, New York.

REFERENCES:

1. Legget, R.F., Cities and Geology, McGraw-Hill, NewYork, 624 p., 1973.
2. Johansen, John and Mathiesen, C.F., Modern Trends in Tunnelling and Blast Design, AA Balkema, 154p, 2000.
3. Per-Anders Persson, Roger Holmberg, Jaimin Lee, (1993), Rock blasting and explosives Engineering, CRC Press, p.560.
4. Bickel, J.O., Kuesel, T.R. and King, E.H., Tunnel Engineering Handbook, Chapman & Hall Inc., New York and CBS Publishers, New Delhi, 2nd edition, Chapter 6, 544p, 1997.

E RESOURCES:

1. www.cowi.com/.../bridgetunnelandmarinestructures/tunnels/.../021-1700-020e-10b_
2. https://miningandblasting.wordpress.com/list-of-technical-papers/

Course Outcomes:

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

1. Understand art of tunneling, tunnel engineering, future tunneling considerations
2. Understand different types Tunneling Methods
3. Understand drilling principles, drilling equipment, explosives, initiators, blasting mechanics
4. Understand tunneling by different machines
5. Understand Tunnel Services

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech		
Code: 7B108	CREATIVITY AND INNOVATIONS MANAGEMENT (Open Elective)	L	T	P
Credits: 3		3		-

Prerequisites: NIL

Course Objectives:

To enhance creative potential by strengthening various mental abilities and shape an ordinary learner to become an extraordinary learner; to expand the knowledge horizon of individual creativity and corporate creativity to transform the living conditions of the society.

MODULE I: Creativity [10 Periods]

Realms of Creativity: Creativity Concept- Convergent and Divergent Thinking- Creative abilities - Creativity Intelligence, Enhancing Creativity Intelligence-Determinants of Creativity - Process- **Roots of Human Creativity**-Biological, Mental, Spiritual Social- Forms of Creativity- Essence, Elaborative and Expressive-Existential, Entrepreneurial and Exponential.

MODULE II: Creative Personality [10 Periods]

Creative Personality: Traits - Congenial to Creativity- Motivation and Creativity- Strategies for Motivation for being creative-

Conductive Environment: Formative Environment and Creativity- Environmental Stimulants- Blocks to Creativity- Strategies for unblocking Creativity.

MODULE III: Corporate Creativity [10 Periods]

A: Corporate Creativity: Creative Manager- Creative Problems Solving, Techniques of Creative Problem Solving- Perpetual Creative Organizations-Creative Management Practices:

B: Various Management techniques: Human Resource Management, Marketing Management, Management of Operations, Management of Product Design and Growth Strategies – Collective Creativity.

MODULE – IV: Creative Organisation [9 Periods]

Creative Organisation: Issues and approaches to the Design of Creative Organizations - Successful innovative organization structure.

Mechanisms stimulating Organizational Creativity- Creative Societies, Model of creative society.

MODULE – V: Management of Innovation [9 Periods]

Management of Innovation: Nature of Innovation-Technological Innovations and their Management, Management Innovative entrepreneurship.

Agents of Innovation-Skills for Sponsoring Innovation, Practice cases and situations.

TEXT BOOKS

1. P. N. Rastogi, **"Managing Creativity of Corporate Excellence"**, Macmillan, New Delhi.

REFERENCE BOOKS:

1. Jone Ceserani, Pater Greatwood, **"Innovation and Creativity",** Crest Publishing House, New Delhi.
2. Pradip Khandwalla, **"Lifelong Creativity"**- An Unending Quest, Tata McGraw Hill, 2006.
3. Pradip Khandwalla, **"The Corporate Creativity"** -The Winning Edge, Tata McGraw Hill New Delhi.
4. Christensen Clayton, **"Innovation and General Manager"**, Tata McGraw Hill.

5. Margaret. A,Whit& Gary D. Bruton- **"The Management of Technology Innovation- A Strategic Approach".**
6. CSG Krishnama Charyulu & R. Lalitha- **"Innovation Management"**, Himalaya Publishing House, 2007.

E RESOURCES:

1. http://www.learnerstv.com/Free-Management-Video-lectures-ltv132-Page1.htm
2. http://linksp.com/article/Reingold-LINK-Creative-Manager-Job-Posting-Jan-15.pdf
3. http://creativeskillset.org/creative_industries/advertising_and_marketing_communications/job_roles
4. http://nptel.ac.in/courses/109101003/15
5. http://nptel.ac.in/courses/109104107/

Course Outcomes:

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

1. Understand the basic concepts of creativity management.
2. Develop a creative personality and can become an extraordinary learner.
3. Student will be able to understand the techniques of Creative Problem Solving and Creative Management Practices.
4. Understand the Issues and approaches to the Design of Creative Organizations and Mechanisms stimulating Organizational Creativity.
5. Understand the nature and management of innovation.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech		
Code: 7B136	DIGITAL MARKETING (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: NIL

Course Objective:
The objective of this course is to expose the student to digital marketing mainly for lead generation and retention activities in both business to business and business to consumer environments.

MODULE-I: Digital marketing [9 Periods]
Introduction of Digital Marketing: Digital Marketing meaning- need of digital marketing- Digital Marketing Vs Traditional Marketing- Digital Marketing Process-
Creating digital marketing strategy- Digital Marketing era and the way forward.

MODULE-II: Search Engine and Social media Optimization [10 Periods]
Introduction to Search Engine Optimization: What is Search Engine?, Type of Search Engines, Search Engine Optimization Types- SEO life cycle Difference between Organic and Inorganic- Keyword Research -Google Trends- On-Page Optimization- Off-Page Optimization.
Introduction to Social Media Optimization: Social Media- importance- Social Media Marketing- Branding - Paid Advertising – Blogging- Face book –Twitter, LinkedIn- Slide Share- Social Media Management Tool (SMMT).

MODULE-III: Google Adwards and tools [10 Periods]
A. Google Adwards: Navigating through Google AdWords- Understanding Google AdWords Structure- Writing Ads in Google AdWords
B. Google Tools: Keyword Planner Tool- Google Webmaster Tool- Google Analytics- Reporting and Analysis Tool.

MODULE-IV: E-Mail marketing [10 Periods]
Email Marketing: How Email works?- Challenges while sending bulk emails- Solution over challenges- Types of email marketing- Email marketing Tools
Designing of Email template- Email marketing scheduler- Email marketing success tracking - Lead Generation for Business.

MODULE-V: Forms of Digital Marketing [9 Periods]
Other forms of Digital marketing: Mobile marketing- Inbound marketing-content marketing
E-commerce marketing- affiliate marketing- YouTube channel marketing.

Text Books

1. Vandana Ahuja, **Digital Marketing – Oxford Higher Education-2015**

Reference books:

1. Philip Kotler, Kevin Lane Keller, Abraham Koshy and Mithleshwar Jha: **Marketing Management,** 13/e, Pearson Education, 2012.
2. Michael miller, **B2B Digital Marketing: Using the Web to Market Directly to Businesses, 1/e,** Pearson Education.
3. Dave Chaffey, Fiona Ellis-Chadwick**, Digital Marketing: Strategy, Implementation and Practice,** Pearson, 6th edition -2015.
4. Jeanniey Mullen, David Daniels, Email Marketing: an Hour a Day, Times Knowledge series-2010.

E Resources:

1. http://freevideolectures.com/Course/2752/Future-of-Marketing
2. http://www.onlinevideolecture.com/?course=mba-programs&subject=marketing-fundamental
3. http://nptel.ac.in/courses/110104070/
4. http://nptel.ac.in/courses/110104068/

Course Outcomes:

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

1. Learn the basics of digital marketing and also be able to develop a comprehensive digital marketing strategy
2. Understand the concept of search engine and its optimization process.
3. Understand the basic concepts of social media marketing and its management.
4. Learn the basics of Google Adwards and tools and its application in digital marketing.
5. Learn various emerging platforms of digital marketing.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B. Tech.		
Code: 70H08	INTERPRETATION SKILLS AND ANALYTICAL WRITING (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisite: Nil

Course Objective: To determine how well the students can develop a compelling argument in writing for an academic audience. Further helps them to involve in critical thinking and persuasive writing exercises. This course also intends to develop effective writing skills to analyze and evaluate the data and ideas for better comprehension. On the other hand this course encourages students to learn strategies for becoming accurate readers and critical analysts.

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 **[10 Periods]**
- 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: Approaches to Reading **[9 Periods]**
- Biographical
- Historical
- Gender
- Sociological

MODULE III: Critical Reading **[10 Periods]**
- 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 IV: Analytical Writing **[10 Periods]**

- 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: Creative Writing **[9 Periods]**

- Figurative Language
- Imagery
- Writing a short Poem
- Writing a short Story

REFERENCES

1. GRE by CliffsTestPrep-7th edition
2. GRE Exam- **A Comprehensive Program**
3. M H Abraham **Glossary of English Literary terms**
4. GD Barche **Interpreting Literature- A Myth and a Reality**
5. Wilbur Scott- **Five approaches to literary criticism**.

E RESOURCES

1. http://www.brad.ac.uk/staff/pkkornakov/META.htm(Introduction to Interpretation Skills)
2. http://literacyonline.tki.org.nz/Literacy-Online/Planning-for-my-students-needs/Effective-Literacy-Practice-Years-1-4/Approaches-to-teaching-reading (Approaches to Reading)
3. https://www.csuohio.edu/writing-center/critical-reading-what-critical-reading-and-why-do-i-need-do-it (Critical Reading)
4. https://www.ets.org/gre/revised_general/about/content/analytical_writing(Analytical Writing)
5. http://www.writerstreasure.com/creative-writing-101/ (Creative Writing)
6. http://www.academypublication.com/issues/past/jltr/vol04/06/11.pdf (Interpreting Skills)
7. http://onlinelibrary.wiley.com/doi/10.1111/j.1540-4781.1983.tb01478.x/full (Approaches to Reading)
8. https://vhhscougars.org/files/vhhs/docs/n10/crj_faqs.pdf (Critical Reading)
9. http://www.msmbainusa.com/articles/entrance-preparations/prepare-for-gre-analytical-writing-tasks/ (Analytical Writing)
10. http://scholarworks.rit.edu/jcws/aimsandscope.html (Creative Writing)
11. https://www.youtube.com/watch?v=N0ePX99GM70 (Approaches to Reading)
12. https://www.youtube.com/watch?v=5Hc3hmwnymw (Critical Reading)
13. https://www.youtube.com/watch?v=ix1qUEM9ahg (Analytical Writing)
14. https://www.youtube.com/watch?v=6Y2_oQobo_0 (Creative Writing)

Course Outcomes:

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

1. Think critically and help in writing analytically.
2. Get real life experiences through interpretation of literature.
3. Learn strategies for becoming accurate readers and critical analysts
4. Think logically towards social, political, economical, legal and technological issues.
5. Draw their career vision and mission independently.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70H09	WORLD LITERATURES (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisite: Nil

Course Objectives:

The undergraduates need to know about the societies across the globe to understand their society better and to bring awareness about the societies across the globe. As a result the students would understand the cultures of different nations as they are going to enter into global careers and have a considerable knowledge about these cultures of different nations will help them to cope with the culture shock. Identify and describe distinct literary characteristics of modern literature. This further helps the learners to effectively communicate ideas related to modern works during class and group activities.

MODULE I:

- **Introduction to literature** **[9 Periods]**
- **Elements of literature(Key Concepts)**

MODULE II: **[9 Periods]**

- **Figures of Speech**

MODULE III: **[10 Periods]**

- **Poetry**

Ode to Autumn by **John Keats**
Mending the Wall by **Robert Frost**
Clouds and Waves by **Ravindranath Tagore**

MODULE IV: **[10 Periods]**

- **Short Stories**

The Eyes are Not Here by **Ruskin Bond**
The Policeman and the Rose by **Raja Rao**
Cat in the Rain by **Ernest Hemmingway**

MODULE V: **[10 Periods]**

- **One - act plays**

A Marriage Proposal by Anton Chekov

The Price by Arthur Miller

REFERENCES

1. Guy de Maupassant, "**Original Short Stories of Maupassant",** The Floating Press, 2014.
2. Robin Pickering-Iazzi, "**Unspeakable Women: Selected Short Stories Written by Italian Women during Fascism",** The Feminist Press, New York, 1993.

ERESOURCES

1. www.naosite.lb.nagasaki-u.ac.jp/dspace/bitstream/.../keieikeizai70_03_08.pdf
2. www.poetryfoundation.org
3. www.bigbridge.org/BB17/poetry/indianpoetryanthology/Gieve_Patel.html
4. http://gepeskonyv.btk.elte.hu/adatok/Anglisztika/74Barcs%E1k/index.html (Introduction to literature)
5. http://hrsbstaff.ednet.ns.ca/ldownie/Eng%2011%20seven_key_elements_of_literature.htm (Elements of literature)
6. https://literaryterms.net/figures-of-speech/ (Figures of Speech)
7. http://www.one-act-plays.com/ (One-Act-Plays)
8. https://bridgepoint.equella.ecollege.com/curriculum/file/cd11d642-a307-496d-b8f0-9c207abc4b42/1/ENG125%20-%20About%20Journals.p (Introduction to literature)
9. http://www.biblicalresearchjournal.org/brj-pages_pdf/001ewb_figures_of_speech.pdf (Figures of Speech)
10. https://www.youtube.com/watch?v=xC3M9EqduyI&list=PLbMVogVj5nJSrNC8yTkDpzu5uRzX5re9q (Introduction to literature)
11. https://www.youtube.com/watch?v=YM6rdgXvemM (Poetry)

Course Outcomes:

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

1. Learn about the literatures of different nations and continents.
2. Understand 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.
3. Display a working knowledge of the historical and cultural contexts of world literature.
4. Analyze literary works for their structure and meaning.
5. Write analytically about literature using guidelines.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B14	APPLIED STATISTICS (Open Elective)	L	T	P
Credits: 3		3	-	-

Pre-requisite: Nil

Course Objective: Uncertainty is found everywhere. It is therefore essential to understand the techniques for handling and modeling it. This course is meant to provide a grounding in Statistics and foundational concepts that can be applied in modeling processes and decision making. These would come in handy for the prospective engineers in most branches.

MODULE I: Analysis of Variance & Analysis of Co-variance [9 Periods]

Analysis of Variance (ANOVA): one-way & two-wav ANOVA and multiple comparisons. Introduction to Factorial design - 2^2 and 2^n Factorial design.

Analysis of Co-variance (ANCOVA) (Only one way). Conducting ANCOVA – Two way

MODULE II: Design of Experiments [10 Periods]

Design of Experiments: Importance and applications of design of experiments. Principles of experimentation, Analysis of Randomized Block Design (R.B.D) , Completely randomized Design (C.R.D) and Latin Square Design (L.S.D) including one missing observation, expectation of various sum of squares. Comparison of the efficiencies of above designs.

MODULE III: Statistical Quality Control [10 Periods]

A: Importance of SQC in industry. Statistical basis of Shewart control charts. Construction of control charts for variables (mean,range and standard deviation) and attributes (p, np, c & d charts with fixed and varying sample sizes).

B: Interpretation of control charts. Natural tolerance limits and specification limits process capability index. Concept of Six sigma and its importance, Single and double sampling plans.

MODULE IV: Correlation, Regression & Time Series [10 Periods]

Correlation & Regression: Correlation, Coefficient of correlation, the rank correlation. Regression, Regression Coefficient, The lines of regression: simple regression, regression for 3 independent variables

Time Series: Fitting a trend line to a time series, Method of least Squares and Method of Moving Averages, Measure of Seasonal Variation.

MODULE V: Queuing Theory [9 Periods]

Structure of a queuing system, Operating Characteristics of queuing system, Transient and Steady states, Terminology of Queuing systems, Arrival and service processes, Pure Birth-Death process Deterministic queuing models, (M/M/1):(∞:FIFO) Model, (M/M/1):(N:FIFO) Model .

TEXT BOOKS:

1. V.K.Kapoor and S.C.Gupta, **"Fundamentals of Applied Statistics"**, Sultan Chand & Sons , New Delhi.
2. J K Sharma, **"Operations research Theory and applications",** Macmillan publishers India limited, 4th edition.

REFERENCES

1. Willam Feller : **"Introduction to Probability theory and its applications"**. Vol–I, Wiley 2nd edition.
2. GoonAM, Gupta MK, Das Gupta B : **"Fundamentals of Statistics"**, Vol-I, The World Press Pvt.Ltd.,
3. Montgomery, **"Applied statistics and probability for engineers"**. John Wiley Publications, 5th edition.
4. V.K.Kapoor and S.C.Gupta: **"Fundamentals of Mathematical Statistics"**, Sultan Chand & Sons , New Delhi

E-RESOURCES

1. https://onlinecourses.science.psu.edu/stat502/node/183 (ANCOVA)
2. http://www.uoguelph.ca/~dsparlin/sqc.htm (Statistical Qualitycontrol)
3. http://irh.inf.unideb.hu/~jsztrik/education/16/SOR_Main_Angol.pdf (Basic Queueing Theory)
4. https://www.math.kth.se/matstat/gru/sf2943/ts.pdf (Time Series Analysis)
5. http://nptel.ac.in/courses/105105045/40 (correlation and regression Analysis)

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

1. Perform Analysis of variance, ANCOVA and design of experiments in manufacturing firms.
2. Apply advanced design of experiments and their applications.
3. Understand the concept of quality control, Six Sigma and its importance to real life problems.
4. Understand the concept of Correlation, regression and Application of Time-series,
5. Find the expected queue length, the ideal time, the traffic intensity and the waiting time.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B16	OPTIMIZATION TECHNIQUES (Open Elective)	L	T	P
Credits: 3		3	-	-

Pre-requisites: Nil

Course Objective: This course deals with the extremely important topics under the broad umbrella of optimization. This is synonymous with efficiency which is the underlying prime rationale for all scientific and technological advances and progress.

MODULE I: Introduction to Operations Research **[10 Periods]**

Definition, scope, objectives, phases, objectives, models and limitation of Operations Research, Linear Programming Problem-Formulation of LPP, Graphical solution of LPP, Simplex method, Artificial variable, big-M method, two-phase method, degeneracy & unbound solution.

MODULE II: Transportation Problems **[10 Periods]**

Formulation, solution, Un balanced Transportation problem, Finding basic feasible solution-Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method.

Assignment Models: Formulation. Hungarian method for optimal solution. Solving unbalanced problem. Travelling salesman problem as assignment problem.

MODULE III: **[10 Periods]**

A: Sequencing Models: Solution of sequencing problem-processing n jobs through 2 machines, processing n jobs through 3 machines, processing 2 jobs through m machines, processing n jobs through m machines.

B: Replacement Models: Replacement of items that deteriorate whose maintenance cost increase with time without change in the money value. Replacement of items that fail suddenly: individual replacement policy, group replacement policy.

MODULE IV: Game Theory **[9 Periods]**

Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. solution of games with saddle points, dominance principal. Rectangular games without saddle points-mixed strategy for2x2 games.

MODULE V: Inventory Models **[9 Periods]**

Inventory cost, Models with deterministic demand-model (a) demand rate uniform and production rate infinite, model(b) demand rate non-uniform and production rate infinite, model(c)demand rate uniform and production rate finite.

TEXT BOOKS

1. S.D.Sharma, **"Operations Research",** Kedarnath & Ramnath Publisher, 15th edition, 2013.
2. J.K. Sharma, **"Operations Research Theory & Applications",** Macmillan India Ltd, 4th edition.

REFERENCES

1. P.Sankara Iyer, **"Operations Research",** Tata McGraw-Hill, 2008.
2. Taha, **"Operations Research"**, TMH, 2010.
3. A.M.Natarajan,P.Balasubramani,A.Tamilarasi, **"Operations Research",** Pearson Education, 2005.

4. Hiller & Libermann, **"Introduction to Operations Research",** McGraw Hill Publications, 9th Edition, 2010.

E-RESOURCES

1. http://www.mhhe.com/engcs/industrial/hillier/etext/PDF/chap03.pdf (LPP)
2. http://ocw.nctu.edu.tw/upload/classbfs121001503719748.pdf (Transportation Problems)
3. http://shodhganga.inflibnet.ac.in/bitstream/10603/19544/12/7_chapter%201.pdf (Replacement Models)
4. https://www.math.ucla.edu/~tom/GameTheory/mat.pdf (Game Theory)
5. http://www.ime.unicamp.br/~andreani/MS515/capitulo12.pdf (Inventory Models)

Course Outcomes:

After completion of the course students will be able to:

1. Find feasible solution to LPP by various Methods.
2. Minimize the cost and time by using Travelling salesmen Problem.
3. Understand the various concepts of Replacement model problems.
4. Solve the game theory problems.
5. Understand the various concepts of inventory models.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B18	NANO MATERIALS (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objective: The objective is to provide different methods of synthesis and characterization of nano materials.

MODULE I: Physical Methods **[10 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 **[10 periods]**

Nanocrystals by chemical reduction, photochemical synthesis, electrochemical synthesis, Nano crystals of semiconductors.

MODULE III: Thermal Methods & Surface Characterization **[10 periods]**

III A-Thermal Methods:

Thermolysis route – spray pyrolysis and solved metal atom dispersion, sol-gel method solvothermal and hydrothermal routes, solution combustion synthesis, CVD method.

III B: Surface Characterization

Scanning electron microscopy (SEM), Transmission electron microscopy (TEM). Photo luminescence Spectroscopy.

MODULEIV: 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).

MODULEV: Properties and Applications of Nano materials **[9 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.

REFERENCES:

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. T Pradeep, "**NANO: The Essentials: Understanding Nanoscience and Nanotechnology".** Tata McGraw-HillPublishing Company Limited, Revised Edition, 2007
4. Z L Wang, "**Characterization of Nanophase Materials"** Wiley-VCH, 1st Edition**,** 2000.
5. K Vijaya Kumar, T Sreekanth and S Chandralingam, "**Engineering Physics",** S Chand and Co 1st Edition, 2008.

E-RESOURCES:

1. http://nptel.ac.in/courses/103103033/module9/lecture1.pdf
2. http://courses.washington.edu/overney/NME498_Material/NME498_Lectures/Lecture4-Overney-NP-Synthesis.pdf
3. https://www.ttu.ee/public/m/Mehaanikateaduskond/Instituudid/Materjalitehnika_instituut/MTX9100/Lecture11_Synthesis.pdf
4. http://www.materialstoday.com/nanomaterials/journals/
5. https://www.journals.elsevier.com/nanoimpact
6. http://www.springer.com/materials/nanotechnology/journal/12274
7. http://nptel.ac.in/courses/118104008/
8. http://nptel.ac.in/courses/118102003/

Course Outcomes:

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

1. Be aware of different physical methods of synthesis of nano materials.
2. Be aware of different chemical methods of synthesis of nano materials.
3. Understand different thermal methods of synthesis of nano materials and to learn different surface characterization techniques.
4. Acquire the different compositional and structural characterization techniques.
5. Develop basic knowledge on the properties and applications of few nano materials

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B19	NDT AND VACUUM TECHNOLOGY (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objective: The objective is to provide a basic level of understanding on Non-destructive testing and Vacuum technology.

MODULE I: Introduction to Non destructive testing [10 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 [10 Periods]
A: Introduction to Vacuum Technology
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
Molar flow, Mass flow and throughput; Rota meters and chokes; differential pressure techniques;

MODULE IV: Pressure gauges [9 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

E-Resources:
1. http://www.enfm.net/catalog/catalog/enfm-usa.pdf
2. http://web.itu.edu.tr/~arana/ndt.pdf
3. http://www.issp.ac.ru/ebooks/books/open/Nondestructive_Testing_Methods_and_New_Applications.pdf
4. https://www.journals.elsevier.com/ndt-and-e-international/
5. https://www.journals.elsevier.com/vacuum

6. http://nptel.ac.in/courses/114106035/35
7. http://nptel.ac.in/courses/112101004/37
8. http://nptel.ac.in/courses/112106138/22

Course Outcomes:

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

1. Be aware of the concepts of NDT
2. Learn different methods of NDT.
3. Get Introduced to Vacuum technology and learn the concepts of flow meters.
4. Develop basic knowledge of pressure gauges.
5. Understand the concepts of different vacuum pumps.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B21	NANO CHEMISTRY (Open Elective)	L	T	P
Credits: 3		3	-	-

Prerequisites: Nil

Course Objective: 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 in analyzing the nanomaterials. To make aware of the learners about different applications of nano materials.

MODULE I : Nano Chemistry-I **[8 Periods]**

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 **[10 Periods]**

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 **[10 Periods]**

A: Characterization techniques: Principles involved in Scanning Electron Microscopy(SEM), Electron Dispersion Spectroscopy(EDS).

B: Transmission Electron Microscopy (TEM), Dynamic Light Scattering (DLS) and Atomic Force Microscopy(AFM) -Illustrative examples.

MODULE IV : Carbon Nano Tubes and Application **[10 Periods]**

Carbon Nano structures ,types and preparation of Carbon Nano tubes.Nano structured crystals. Graphene, Carbon nano-fibers- Carbon clusters and Fullerenes- optical and telecommunication applications.Organic Nano Solar cells and its applications.

MODULE V: Environmental Nanotechnology **[10 Periods]**

Implications of Nanotechnology & Research needs-Nano structured Catalysts TiO2 Nano particles for Water purification- Nano membranes in Drinking water treatment and desalination, Nano membranes in Sea desalination-Nano particles for treatment of Chlorinated Organic Contaminants.

TEXT BOOKS:

1. Mark A. Ratner, D. Ratner. **"Nanotechnology a gentle introduction to the next big idea"** ,Pearson Education Inc., Asia, 2003.
2. Pradeep.T. "Nano: The essentials-understanding nano science and nanotechnology". Tata Mc.Graw Hill, New Delhi, 2007.

REFERENCES:

1. A. K. Haghi, Ajesh K. Zachariah, Nandakumar Kalariakkal. **"Nanomaterials: Synthesis, Characterization, and Applications"**. Apple Academic Press, 2013.
2. Brechignac C., Houdy P., Lahmani M. (Eds.) **"Nanomaterials and Nanochemistry"** (Springer,) 748p. ISBN 978-3-540-72993-8, 2007

3. Phani kumar. **"Principles of nanotechnology",** Scitech Publications 2nd Edition, 2010.
4. Preeti jain, Shankar lal Garg. **"Environmental Nanotechnology"** Lap lambert Academic publishing , 2015.

E RESOURCES

1. www.docbrown.info/page03/nanochem02.htm (Nanochemistry applications)
2. https://books.google.co.in/books?isbn=352732626X (concepts of nanochemistry)
3. Journal of nanostructure in chemistry (springer publishers)
4. Nanochemistry (wiley publishers)
5. nptel.ac.in/courses/118104008/6 (Introduction to nanomaterials)
6. nptel.ac.in/courses/118104008/ (Nanostructures and nanomaterials)

Course Outcomes

After completion of the course, students will be able to

1. Students will learn the different synthetic methods of the nano materials.
2. To know the student Electronic, optical and magnetic properties of nanomaterials.
3. To acquire the knowledge various instrumental methods of analysis (TEM, EDS, SEM, DLS &AFM).
4. The students can come to know the carbon nano tubes, carbon nano fibers, nano structured catalysts and organic nano solar cells.
5. Students will learn usage of nano materials in the purification of water.

2017-18 Onwards (MR-17)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech.		
Code: 70B22	PHOTOCHEMISTRY AND SPECTROSCOPY (Open Elective)	L	T	P
Credits: 3		3	-	-

Pre-requisite: Nil

Course Objective: 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 spectrum.

MODULE I: **Photochemistry I** **[10 Periods]**

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 II** **[10 Periods]**

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 **[10 Periods]**

A: Introduction and importance; Principles and instrumentation; Interferences - Chemical & Spectral methods.

B: Applications of Atomic Absorption Spectroscopy for qualitative and quantitative analysis. UV-Visible spectroscopy: principles, applications for qualitative and quantitative analysis.

MODULE IV: IR Spectroscopy **[09 Periods]**

Introduction- basic principles, Instrumentation. Identification of some functional groups applications for qualitative and quantitative analysis.

MODULE V: Nuclear Magnetic Resonance Spectroscopy **[09 Periods]**

Introduction-basic principles , Instrumentation – chemical shift- Spin-Spin splitting- coupling constant, Spin decoupling, shift reagents. Structure determination, applications of proton NMR spectroscopy.

TEXT BOOKS:

1. Mohan Jag, **"Organic spectroscopy: Principles and applications",** 2nd Edition, 2000.
2. R.O. Kan**, "Organic Photochemistry",** McGraw-Hill series in advanced chemistry, New York, 1966**.**

REFERENCES:

1**.** J.Mendham, R.C. Denney, J.D. Barnes and M.J.K. Thomas, **"Vogel's Text Book of Quantitative Chemical Analysis",** Pearson Education Pvt. Ltd., New Delhi, 6th edition, 1999.
2. C.N. Banwell and E.M.Mc cash, **"Fundamentals for molecular spectroscopy"** 4th edition, 1994.
3. N.J Turro, **"Modern molecular photochemistry",** The Benjamin/comings publishing 1991.
4. John R.Dyer , K.L. Rinehart, **"Applications of Absorption Spectroscopy of Organic Compounds",** Prentice-Hall of India Pvt. Ltd., New Delhi, 1969.

5. Hobart H.Willard and D.U.Merritt & J.R.J.A, **"Instrumental Methods of Analysis",** Dean, C.E.S Publishers and distributors, 1986.

E RESOURCES

1. photobiology.info/Ilichev.html (photochemistry theoretical concepts and reaction mechanisms)
2. https://chem.libretexts.org/.../Spectroscopy/...Spectroscopy/Infrared_Spectroscopy (IR spectroscopy)
3. www.spectroscopynow.com/.../journal/sepspec1730journal/Spectroscopy-Europe-Ma (Magazine)
4. Journal of spectroscopy (Hindawi publishers)
5. nptel.ac.in/courses/103108100/31 (Infrared spectroscopy)
6. https://www.youtube.com/watch?v=o8zELwp358A (UV-Visible spectroscopy)

Course Outcomes

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

1. Aware about the light matter interaction.
2. Understand various law's of photochemistry such as Grotthuss-Draper, Stark-Einstein and Lambert-Beer law's.
3. Get knowledge about qualitative and quantitative analysis of various samples by Absorption spectroscopy.
4. Identify the functional groups in organic molecules by IR spectrum.
5. Acquire the knowledge of structural elucidation of organic molecules by proton NMR spectroscopy.