COURSE STRUCTURE
AND
DETAILED SYLLABUS
(MR14 Regulations)

For

B.Tech (MECHANICAL ENGINEERING)

(Applicable for the batches admitted from 2014-15)

MALLA REDDY ENGINEERING COLLEGE

(AUTONOMOUS)

(An Autonomous institution, Autonomy granted by UGC and affiliated to JNTUH, Accredited by NAAC with 'A' Grade, Accredited by NBA (2008-11) & Recipient of World Bank Assistance under TEQIP phase – II S.C.1.1for the period (2011-14))

Maisammaguda, Dhulapally (Post. Via. Kompally), Secunderabad – 500 100.

Website: www.mrec.ac.in Email: mrec.2002@gmail.com

MALLA REDDY ENGINEERING COLLEGE
(AUTONOMOUS)
Academic Regulations for B. Tech. (Regular)
(MR14 Regulations)

(Effective for the students admitted into I year from the Academic year 2014-2015 onwards)

1. **Award of B. Tech. Degree**

A student will be declared eligible for the award of B. Tech. Degree if he fulfills the following academic regulations:

1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.

1.2 **After eight academic years of course of study, the candidate is permitted to write the Examinations for two more years.**

1.3 The candidate shall register for 224 credits and secure 216 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project work

2. The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in B. Tech. course.

3. Courses of study

The following courses of study are offered at present as specializations for the B. Tech. Course:

Branch Code	Branch
1	Civil Engineering(CE)
2	Electrical and Electronics Engineering (EEE)
3	Mechanical Engineering(ME)
4	Electronics and Communication Engineering(ECE)
5	Computer Science and Engineering (CSE)
7	Mining Engineering(MNE)

4. Credits

	Semester	
	Periods/ Week	**Credits**
Theory	04	04
	--	--
Practical	03	02
Drawing	Theory - 02	04
	Practical - 03	
Mini Project	--	02
Comprehensive Viva Voce	--	02
Seminar	--	02
Project	15	10

5 Distribution and Weightage of Marks

5.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 75 marks for a practical subject. In addition, industry-oriented mini-project, seminar, comprehensive viva and project work shall be evaluated for 50, 50, 100 and 200 marks, respectively.

5.2 For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End- Examination.

5.3 For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of one objective paper, one essay paper and one assignment. The objective paper and the essay paper shall be for 10 marks each with a total duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for essay paper). The Objective paper is set with 20 bits of multiple choices and filling the blanks type of questions for a total of 10 marks. The essay paper shall contain 4 full questions out of which, the student has to answer 2 questions, each carrying 5 marks. While the first mid-term examination shall be conducted in First 2 1/2 units of the syllabus, the second mid-term examination shall be conducted in Remaining 2 1/2 units. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned). Assignment should be submitted before the end of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. The total marks secured by the student in each mid-term examination are evaluated for 25 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each student. If any student is absent for any subject of a mid-term examination, a re-exam will be conducted in the deserving cases based on the recommendations of College Academic Committee. The end examination will be conducted for 75 marks, which contains PART A and PART B. Part A for 25 marks contains 5 to 8 questions, each two marks and remaining are one mark questions covering the entire syllabus. Part B is for maximum of 50 marks with 5 questions covering from all units consisting of two parts each (a) and (b), Out of which the student has to answer either (a) or (b) not both. Each question in Part B carries 10 marks.

5.4 For practical subjects there shall be a continuous evaluation during a semester for 25 sessional marks and 50 end semester examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and internal examiner. The external examiner shall be appointed by the principal / Chief Controller of examinations

5.5 For the subject having design and/or drawing (Machine Drawing) and Estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

5.6 There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV year II Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an **External Examiner**, head of the department, and the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.

5.7 There shall be a seminar presentation on specific Applied Engineering Topic in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee

consisting of head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for the seminar.

5.8 There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is intended to assess the students understanding of the subjects he studied during the B. Tech. course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

5.9 Out of a total of 200 marks for the project work, 50 marks will be allotted for Internal Evaluation and 150 marks for the End Semester Examination (Viva Voce). The End Semester Examination of the project work shall be conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year II Semester. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

5.10 Laboratory marks and the sessional marks awarded by the concerned teacher are subjected to scrutiny and scaling by the Principal / Chief Controller of examinations wherever necessary. In such cases, the sessional and laboratory marks awarded by the concerned teacher will be referred to a Committee headed by principal consisting of HOD, senior professor in that particular department. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The internal test papers including Lab end exam test papers shall be preserved in the exam branch for a minimum period of 6 years from the commencement of the batch, as per the University norms and shall be produced to the Committees as and when the same are asked for.

6 Attendance Requirements

6.1 A student shall be eligible to appear for End examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

6.2 **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**

6.3 Condonation of shortage of attendance in aggregate up to 10% amounting to 65% and above and below 75% in each semester may be granted by the College Academic Committee.

6.4 A student will not be promoted to next semester unless he satisfies the attendance requirement of the present semester as applicable.

6.4 A student who is short of attendance in a semester has to seek re-admission into that semester as and when offered within 4 weeks from the date of the commencement of class work.

6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration Stands cancelled.

6.6 A stipulated fee shall be payable towards condonation of shortage of attendance.

6.7 A student will be promoted to the next semester if he satisfies the attendance requirement of the present semester, as applicable, including the days of attendance in sports, games, NCC and NSS activities.

6.8 If any candidate fulfills the attendance requirement in the present semester, shall not be eligible for readmission into the same class.

7. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6.

7.1 A student is deemed to have satisfied the minimum academic requirements if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the end semester exam, and minimum 40% of marks in the sum total of the mid-term and end semester exams.

7.2 A student shall be promoted from II to III year only if he fulfills the academic requirement of

34 credits (out of 84 credits) secured from all Regular and Supplementary examinations conducted upto second year first semester examination.

(or)

44 credits (out of 112) secured from all Regular and Supplementary examinations conducted upto second year second semester examination.

7.3 A student shall be **promoted from III year to IV year** only if he fulfills the academic requirements of

56 credits (out of 140 credits) secured from all Regular and Supplementary examinations conducted upto Third year First semester examination.

(or)

68 credits (out of 168) secured from all Regular and Supplementary examinations conducted upto Third year Second semester examination.

7.4 A student shall register and put up minimum attendance in all 224 credits and earn 216 credits. Marks obtained in the best 216 credits shall be considered for the calculation of percentage of marks.

7.5 Students who fail to earn 216 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

8 Course pattern

8.1 The entire course of study is for four academic years. All 4 years on semester pattern.

8.2 A student, eligible to appear for the end examination in a subject, but absent from it or has failed in the end semester examination, may write the exam in that subject during the period of supplementary exams.

8.3 When a student is detained for lack of credits/shortage of attendance, he may be re-admitted into the next semester. However, the academic regulations under which he was readmitted shall continue to be applicable to him.

9 Award of Class

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured from 216 Credits.
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks obtained in internal evaluation and end semester examination shall be shown separately in the memorandum of marks.)

10 **Minimum Instruction Days**

The minimum instruction days for each semester shall be 90 days.

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

12 Transfer from other colleges will be permitted, as per the rules stipulated by the affiliating University and the State government.

13 WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the college or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

14. **TRANSITORY REGULATIONS**

14.1 Discontinued, detained, or failed candidates are eligible for readmission into that Semester as and when next offered.

14.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

14.3 In case of transferred students from other Universities, the credits shall be transferred to MREC (A) as per the academic regulations and course structure of the MREC (A).

15. GENERAL

15.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers.

15.2 The academic regulation should be read as a whole for the purpose of any interpretation.

15.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the College Academic Committee is final.

15.4 College may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the College Academic Committee.

.

15.5. The students seeking transfer to MREC from various other Universities / Institutions have to pass the failed subjects which are equivalent to the subjects of MREC, and also pass the subjects of MREC which the candidates have not studied at the earlier Institution on their own without the right to sessional marks. 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, the candidates have to study those subjects in MREC in spite of the fact that those subjects are repeated.

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

Maisammaguda, Dhulapally (Post via. Kompally), Secunderabad - 500100

ACADEMIC REGULATIONS FOR B. TECH (LATERAL ENTRY SCHEME)

(Effective for the students admitted into II year from the Academic year 2015-2016 onwards)

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

I. The LES candidates shall pursue a course of study for not less than three academic years and not more than six academic years.

II. They shall be permitted to write the examinations for two more years after six academic years of course work.

2. The candidate shall register for 168 credits and secure 160 credits from II to IV year B.Tech. Program (LES) for the award of B.Tech. Degree with compulsory subjects as listed in Table-1

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project work

Table 1: Compulsory Subjects

3. The students, who fail to fulfill the requirement for the award of the degree in 8 consecutive academic years (6 years of study + 2 years additionally for appearing exams only) from the year of admission, shall forfeit their seats.
4. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech. (LES).
5. **Promotion Rule**

A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.

A student shall be promoted from III year to IV year only if he fulfills the academic requirements of

34 credits (out of 84 credits) secured from all Regular and Supplementary examinations conducted upto Third year First semester examination

(or)

44 credits (out of 112) secured from all Regular and Supplementary examinations conducted upto Third year Second semester examination.

6. **Award of Class**

After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	**From the aggregate marks secured from 160 Credits from II year to IV year.**
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

(The marks obtained in the internal evaluation and the end semester examination shall be shown separately in the marks memorandum.)

7. 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

	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 correlated to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination).	Expulsion from the examination hall and cancellation of the performance in that subject only.
b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall beexpelledfrom examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidates also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course 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 subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course 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 subject.
6	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / 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 the person or to any of his relations whether bywords, either spoken or written or by signs or by visible representation, assaults the officer-in charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police cases registered against them.
7	Leaves the exam hall taking away answer scripter 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 subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.

8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. 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 subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action toward suitable punishment.	

MALLA REDDY ENGINEERING COLLEGE
(AUTONOMOUS)
B. TECH. MECHANICAL ENGINEERING

COURSE STRUCTURE

I YEAR **I SEMESTER**

Code	Subject	L	T	P	C
40E01	English	3	-	-	3
40P01	Engineering Physics - I	4	-	-	4
40C01	Engineering Chemistry - I	3	-	-	3
40M01	Mathematics - I	4	-	-	4
40501	Computer Programming	4	-	-	4
40301	Engineering Drawing - I	2	1	3	4
40502	Computer Programming Lab	-	-	3	2
40C03	Engineering Chemistry Lab	-	-	3	2
40E03	English Language Communication Skills Lab	-	-	3	2
	Total	**20**	**1**	**12**	**28**

COURSE STRUCTURE

I YEAR **II SEMESTER**

Code	Subject	L	T	P	C
40E02	English & Professional Ethics	4	1	-	4
40P02	Engineering Physics - II	3	-	-	3
40C02	Engineering Chemistry - II	3	-	-	3
40M02	Mathematics - II	4	-		4
40302	Engineering Mechanics	4	-	-	4
40303	Engineering Drawing - II	2	-	3	4
40P03	Engineering Physics Lab	-	-	3	2
40304	Auto CAD Lab & EM Lab	-	-	3	2
40305	Engineering & IT Workshop	-	-	3	2
	Total	**20**	**1**	**12**	**28**

COURSE STRUCTURE

II YEAR **I SEMESTER**

Code	Subject	L	T/P/D	C
40306	Machine Drawing	-	6	4
40M05	Probability and Statistics	4	--	4
40230	Basic Electrical and Electronics Engineering	4	--	4
40307	Mechanics of Solids	4	1	4
40308	Thermodynamics	4	1	4
40309	Metallurgy and Materials Science	4	1	4
40231	Electrical and Electronics Engineering Lab	-	3	2
40310	Metallurgy and Mechanics of Solids Lab	-	3	2
	Total	20	9	28

COURSE STRUCTURE

II YEAR **II SEMESTER**

Code	Subject	L	T/P/D	C
40311	Production Technology	4	1	4
40312	Kinematics of Machinery	4	1	4
40313	Thermal Engineering-I	4	1	4
40314	Mechanics of Fluids and Hydraulic Machines	4	1	4
40109	Environmental Studies	4	-	4
40M03	Mathematics-III	4	-	4
40315	Production Technology Lab	-	3	2
40316	Mechanics of Fluids and Hydraulic Machines Lab	-	3	2
	Total	24	16	28

COURSE STRUCTURE

III YEAR **I SEMESTER**

Code	Subject	L	T/P/D	C
40B01	Managerial Economics and Financial Analysis	4	-	4
40317	Engineering Metrology	4	1	4
40318	Dynamics of Machinery	4	1	4
40319	Machine Tools	4	1	4
40320	Design of Machine Members – I	4	1	4
40321	Thermal Engineering-II	4	1	4
40322	Machine Tools & Metrology Lab	-	3	2
40E04	Advanced English Communication Skills Lab	-	3	2
	Total	24	11	28

COURSE STRUCTURE

III Year **II Semester**

Code	Subject	L	T/P/D	C
40323	Automobile Engineering	4	-	4
40324	Finite Element Methods	4	1	4
40325	Refrigeration and Air Conditioning	4	1	4
40326	Design of Machine Members – II	4	1	4
40327	Heat Transfer	4	1	4
	Elective:I			
401A1	1. Disaster Management	4	1	4
40B04	2. Human Values and Professional Ethics			
40B05	3. Intellectual Property Rights			
40328	Heat Transfer Lab	-	3	2
40329	Thermal Engineering Lab	-	3	2
	Total	24	11	28

COURSE STRUCTURE

IV YEAR **I SEMESTER**

Code	Subject	L	T/P/D	C
40330	Operations Research	4	1	4
40331	Power Plant Engineering	4	1	4
40332	CAD/CAM	4	1	4
40333	Instrumentation and Control Systems	4	-	4
	Elective-II:			
403B1	Robotics,			
403B2	Mechanical Vibrations,	4	1	4
403B3	Mechatronics,			
403B4	Composite Materials.			
40B03	Industrial Management			
	Elective-III:			
403C1	Unconventional Machining Process,			
403C2	CNC Technology,	4	1	4
403C3	Automation in Manufacturing,			
403C4	Design for Manufacturing,			
403C5	Nanotechnology			
40334	CAD/CAM Lab	--	3	2
40335	Production Drawing Practice & Instrumentation Lab	--	3	2
	Total	24	11	28

COURSE STRUCTURE

IV YEAR **II SEMESTER**

Code	Subject	L	T/P/D	C
40336	Production Planning & Control	4	1	4
	Elective-IV:			
403D1	Artificial Neural Networks,			
403D2	Total Quality Management,	4	1	4
403D3	Maintenance & Safety Engineering,			
403D4	Plant Layout & Material Handling			
	Elective-V:			
403E1	Renewable Energy sources,			
403E2	Jet Propulsion & Rocket Engineering	4	-	4
403E3	Computational Fluid Dynamics,			
403E4	Gas Dynamics			
40337	Industry Oriented Mini Project	--	--	2
40338	Seminar	--	6	2
40339	Project Work	--	15	10
40340	Comprehensive Viva	--	--	2
	Total	12	23	28

Note: All End Examinations (Theory and Practical) are of three hours duration.

T – Theory P – Practical C – Credits

2014-15 **Code: 40E01**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech I Sem. **L T/P/D C**
3 -/-/- 3

ENGLISH – I
(Common for all Branches)

INTRODUCTION:

There is an increasing concern over the English language competency of Engineering students based on their academic and professional performance. The transformation and the mistreatment of language in the social networking over the last decade have greatly affected the language skills of the students. In keeping with the language skill deficiencies, the present syllabus is designed to hone not only the traditional LSRW skills but also their analytical skills that enable to think too in English. This effective approach to develop English Language competency among the Engineering students aims to kindle the thinking skills to communicate effectively. The classroom activities based on the textbook may be used to build confidence among the students as they become active participants and teachers taking the role of a facilitator.

In the English classes, the focus is on the grammar, vocabulary, reading and, writing. For this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc. The focus is on language error detection as well as correction along with honing vocabulary, reading skills, and writing skills.

The text is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

OBJECTIVES:

a. To facilitate for the improvement of the language proficiency of the students in English with emphasis on Reading and writing skills.

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

c. Analysing intensive reading strategies and discussing how to distinguish between facts and opinions and draw inferences.

d. Enable the students to improve effective writing skills.

f. To develop English Language communication skills in formal and informal situations.

SYLLABUS:

TEXTBOOK PRESCRIBED:

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

1. Text book **English Today** by K.Durga Bhavani & Co. Published by Foundation Books

For Grammar practice

2. **A Work Book on English Grammar and Composition** published by Tata Mac Graw –Hill , New Delhi 2012.
3. Headway's **Academic Skills-reading, writing and study skills-**Level-2 student's book. Oxford publications

UNIT –I:

Chapters entitled 'Competition Matters' and 'Light Pollution' from **English Today**, Published by Foundation Books

Vocabulary:- parts of speech

Grammar:- Articles, Prepositions

Reading :- Introduction to Reading Skills, Reading comprehension.

Writing:- Introduction to writing skills, characteristics of effective writing

UNIT –II

Chapters entitled 'Key to Courage' and 'The Eternal Pilgram' from **English Today**, Published by Foundation Books

Vocabulary**:**– Formation of words, prefixes, suffixes and root words,

Grammar: -Tense, aspect and concord

Reading-Skimming and Scanning

Writing: Paragraph writing- use of cohesive devises

UNIT –III

Chapters entitled 'The Wonders of the New Millennium' and The Lost Child' from **English Today**, Published by Foundation Books

Reading: reading for details.

Grammar: integrated exercises in error detection and correction in tenses and concord.

Vocabulary: homonyms and homophones

Writing: paragraph writing and arranging jumbled sentences into paragraphs

UNIT –IV

Chapters entitled 'A Special Kind of Blessing' and 'How to avoid an Argument' from **English Today**, Published by Foundation Books

Grammar: Voice – exercises

Vocabulary: Phrasal verbs.

Reading: Note making

Writing: Notice and circular writing

UNIT –V

Chapters entitled 'Food: Family and Culture' and 'English in India Today: Some Views' from **English Today**, Published by Foundation Books

Grammar: Speech- exercises,

Vocabulary: Idiomatic expressions

Reading: Reading for specific purposes

Writing: Letter writing- both formal and informal.

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

LEARNING OUTCOMES:

1. Usage of English Language, written and spoken.

2. Enrichment of language accuracy and fluency.

3. Gaining confidence in using flawless English language and skills for writing in real life situations..

REFERENCE BOOKS:

1. Murphy English Grammar (Intermediate)
2. Basic English by Michael Swan
3. Practical English Grammar by Thomson & Martinet
4. Understanding and Using English Grammar by Betty Schrampfer Azar
5. A Communicative Grammar of English by Geoffrey N. Leech
6. Practical English Usage by Michael Swan
7. Oxford Word Skills Basic by Ruth Gairns
8. Improve Your Written English by Marion Field
9. A Student's Introduction to English Grammar (South Asian Edition) 1st Edition by Author: Rodney Huddleston, Geoffrey K. Pullum
10. Essential English Grammar: A Self-Study Reference and Practice Book for Intermediate Students of English with Answers 2nd Edition by Murphy
11. Better English Revised Edition 1st Edition by Norman Lewis
12. Learn English: A Fun Book of Functional Language, Grammar, and Vocabulary 1st Edition (Paperback) by Santanu Sinha Chaudhuri, Tata McGraw Hill Education
13. OXFORD GUIDE TO ENGLISH GRAMMAR 1st Edition by John Eastwod
14. How to Write Correct English (Applied English Grammar) by Rajendra Prasad Sinha
15. Collins Easy Learning Grammar & Punctuation by HarperCollins
16. Vocabulary word power made easy by Norman Lewis

2014-15 **Code: 40P01**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech I Sem. **L T/P/D C**
4 -/-/- 4

ENGINEERING PHYSICS – I
(Common to all branches)

Objectives:

1. To teach the students classification of materials based on the arrangement of atoms, basic concepts of crystallography.
2. To make the students learn the concepts of defects in crystals.
3. To make the students understand the concept of SHM, and different kinds of oscillations.
4. To teach the students the concept of dual nature of matter and experimental support to this concept
5. To expose the students to classical free electron theory and quantum free electron theory and their drawbacks.
6. To teach the students the Band theory and classification of materials based on band theory.
7. To make the students understand the concepts of Fermi level and charge carrier concentrations in semi conductors.
8. To make the students get acquainted with the p n junction diode and its characteristics.
9. To teach the basics of Electromagnetic theory.

UNIT – I

Crystallography and Crystal Structures:

Classification of materials – Crystalline, Amorphous, Poly crystalline; Lattice point, Space Lattice, Basis, Crystal structure, Unit Cell, Crystallographic axes, Lattice Parameters; Crystal Systems – Bravais Lattices; Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC and Diamond structures; Crystal Planes and Directions - Miller Indices, Expression for interplanar distance in cubic system

Defects in Crystals:

Defects and their classification; Point Defects – Vacancies, Interstitial, Impurities, Electronic defects; Qualitative discussion of Schottky and Frenkel defects; Qualitative treatment of line defects (Edge and Screw dislocations); Burger's Vector

UNIT – II

Oscillations :

Introduction; Differential equation for S.H.M. and its solution; velocity and acceleration; expression for period and frequency; graphs of displacement, velocity and acceleration; energy of the simple oscillator; Damped oscillations – under damping, critical damping and over damping; Qualitative treatment of Forced vibrations; sharpness of resonance, Qualitative treatment of electrical oscillator circuit containing inductor, capacitor and resistor

UNIT – III

Principles of Quantum Mechanics:

Waves and Particles - de Broglie's concept of Matter Waves; Davisson and Germer's experiment; G.P.Thomson's experiment. Heisenberg's Uncertainty Principle; Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function; Energy of a particle in a one dimensional infinite potential well.

Band Theory of Solids:

Qualitative discussion of Classical free electron theory; Expression for electrical conductivity of metals; 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

UNIT – IV

Semiconductor Physics:

Introduction, Classification of Semiconductors; Formation of p type and n type materials; Charge carrier concentration in Intrinsic semiconductors; Qualitative treatment of charge carrier concentration in Extrinsic semiconductors; Qualitative treatment of Fermi Level in Intrinsic and Extrinsic Semiconductors; Direct & Indirect Band Gap Semiconductors; Hall Effect; formation of p n junction diode; forward bias and reverse bias, I-V characteristics of pn junction diode; Zener Break down, Avalanche Break down

UNIT – V
Electro Magnetic Theory:

Scalar and Vector fields, Gradient of Scalar field and its physical significance; Divergence and Curl of Vector field; Ampere's Law, Faraday's Law of electromagnetic induction; Induced E.M.F. in a conductor; Lenz's Law, Displacement current, Maxwell equations in differential and integral form, wave equation .

Outcomes:

1. Students shall learn the classification of materials into three categories. With an emphasis on Crystals, they shall learn the concepts of unit cell and Bravais lattices and evaluation of packing factors for different cubic structures and diamond structure.
2. Students shall learn in detail about various point defects like Vacancies, interstitials etc and extend their understanding up to one dimensional defect like Edge and screw dislocations.
3. Student shall understand and appreciate the physics behind the mathematical equations that govern free oscillations, damped oscillations and forced oscillations. Also they shall understand the concept of resonance
4. Students shall get introduced to the fascinating world of quantum mechanics with the basic and key concepts like de Broglie's concept of matter waves and the experimental support given by Davisson and Germer and G.P.Thomson and learn to solve the Particle in one dimensional infinite potential well problem.
5. Students shall learn the Kronig – Penney model which gives rise to Band theory of solids. Also they understand the concept of effective mass of electron.
6. Students shall learn the mathematical treatment of charge carrier concentration in intrinsic and extrinsic semi conductors. Also they shall learn a very interesting phenomenon called Hall Effect and its applications besides learning pn junction diode, its characteristics and the associated breakdown mechanisms.
7. They shall be able to understand the Faraday's laws of electromagnetism and get introduced to Maxwell's equations.

TEXT BOOKS:

1. Modern Engineering Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
2. Engineering Physics – P.K.Palanisamy - SciTech Publications Pvt. Ltd., 5th Print 2008.
3. Applied Physics – S.O. Pillai & Sivakami-New Age International (P) Ltd., 2nd Edition 2008.
4. Unified Physics Vol – I by S L Gupta and Sanjeev Gupta JNPN Publications.
5. Engineering Physics by B K Panedy, S Chaturvedi, Cengage learning

REFERENCE BOOKS:

1. Solid State Physics – M. Armugam (Anuradha Publications).
2. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
3. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
4. Basic Electronics and Linear Circuits by D C Kulshreshtha, S C Gupta, N N Bhargava, TTTI, Chandigarh
5. Solid State Physics – A.J. Dekker (Macmillan).
6. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).
7. A text book of Engineering Physics – S.P. Basvaraju – Subhas store
8. Electricity and magnetism by Edward Purcell – Berkeley series vol 2
9. Physics Vol 2 – Resnick, Halliday & Krane – Fifth edition, Wiley Student edition.
10.Physics – B.Sc. First Year by Dr B Sanjeeva Rao, et al, Telugu Akademi

2014-15 **Code: 40C01**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech. I Sem.

L	T/P/D	C
3	-/-/-	3

ENGINEERING CHEMISTRY – I
(Common for CE, EEE, ME, ECE, CSE & Mining)

Objectives:

1. To make the students to understand the basic concepts of chemistry to develop futuristic materials for high-tech applications in the area of engineering.
2. To explore the economically viable technologies developed for utilizing water resources and to provide basic skills in chemical analysis of water and materials.
3. To study the chemistry of portable energy storage devices like various conventional as well as modern batteries and their usage in different aspects of life.
4. To gain the knowledge of corrosion science and anti corrosive techniques to protect faster corrosion and monitoring of corrosion.
5. To predict and control the properties through an understanding of atomic, molecular, crystalline and microscopic structures of engineering materials.

UNIT –I

Water Technology – I: Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic enbrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal, carbonate and calgon conditioning) .

UNIT- II

Water Technology -II : External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. Potable Water- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis, Electro dialysis and their significance.

UNIT-III

Electrochemistry: Electro Chemical Cells: EMF: Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concentration cells; classification with examples, electro chemical series, Potentiometric titrations, determination of p^H using glass electrode-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; Advantages and Applications.

UNIT-IV

Corrosion And Its Control: Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Inter granular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electro less plating (Ni plating**).**

UNIT- V

Material Chemistry: Lubricants: Classification with examples- Characteristics of a good lubricant & properties of lubricants: viscosity, Cloud point, flash and fire points. Refractories: Classification, characteristics of a good refractory and applications. Nanomaterials: Introduction, preparation by sol-gel & chemical vapor deposition methods and Applications of nano materials.

Outcomes:

As an outcome of completing this course, students will:

1. Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
2. Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries.
3. Analyze and develop a technically sound, economic and sustainable solution to corrosion problems related to engineering service.

Be able to apply core concepts in Materials Science to solve engineering problems

TEXT BOOKS:

1. P. C. Jain and Monica Jain, A text Book of Engineering Chemistry, Dhanapat Rai Publications, New Delhi, 12th Edition 2006.
2. R.V. Gadag and Nithyananda Shetty, A text Book of Engineering Chemistry. I.K International publishing house. Edition 2012.

REFERENCE BOOKS:

1. F.W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, 4th Edition, 1996.
2. M.G. Fontana, N. D. Greene, Corrosion Engineering, McGraw Hill Publications, New York, 3rd Edition, 1996.
3. Principles of Physical Chemistry B.R.Puri, L.R.Sharma & M.S.Pathania, S.Nagin Chand &Co., (1993)., (23rdedition) New Delhi.

2014-15 **Code: 40M01**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech I Sem.

L	T/P/D	C
4	-/-/-	4

MATHEMATICS – I
(Theory of Matrices & ODE)
Common for all

Objectives:

1. Finding inverse of a matrix by elementary transformations
2. Solving system of simultaneous equations
3. Calculate the powers of the matrix & Calculate the inverse of the matrix by CHT
4. Know about the properties of the Eigen values and Vectors, Quadratic forms
5. Know the Applications of second order differential equations
6. Converts a real life problem into a differential equation

UNIT – I

Matrices and Linear systems of equations: Rank of the matrix - Elementary transformations –Echelon form - Normal form – PAQ Form - Inverse from Elementary matrices – Solution of Linear Systems – Consistency of Linear system of equations – Linear and Orthogonal Transformations –Linearly independent and dependent of vectors-LU Decomposition- LU Decomposition from Gauss Elimination –Solution of Tri-diagonal Systems

UNIT – II

Eigen Values, Eigen Vectors, Complex matrices

Eigen values, Eigen vectors – properties – 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.

Complex Matrices: Hermitian, Skew-Hermitian and Unitary – Eigen values and Eigen vectors of complex matrices and their properties.

UNIT – III

Quadratic forms, Ordinary Differential Equations of First Order

G^{-1} – MP inverse- Singular value decomposition

Quadratic forms , Reduction of quadratic form to canonical form – Rank- Nature - index – signature of Quadratic forms.

Applications of First Order Differential Equations: Orthogonal trajectories, Newton's Law of cooling, Law of natural growth and decay.

UNIT – IV

Differential Equations of Second & Higher Order

Definitions- Complete Solutions –Rules for finding Complementary function-Particular integral (R.H.S of the type e^{ax} , $Sin\, ax$, $Cos\, ax$, $Polynomial\ in\ x$, $e^{ax}V(x)$, $x^m v(x)$ and Method of variation of Parameters.

UNIT – V

Laplace Transforms

Definition of Laplace transform, Condition for existence –L.T. of standard functions –Properties of L.T. Transforms of Periodic function , derivatives and integrals – Multiplication by t^n - division by t -Evalution of Integrals - Inverse Transforms- Other methods of finding Inverse Transforms . Convolution theorem –Application of Laplace transforms to ordinary differential equations - Dirac's delta function – Unit step function .

Outcomes:

1. Applies the Theory of Matrices in solving n number of equations
2 Understands how to convert problems in engineering to differential equations
3 Understands the applications of differential equations in second and higher order
4 Understands the Newton's Law of cooling, Law of Natural growth or Decay

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering by Kanti B.Datta ,Cengage Learning
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Introduction to Matrix Analysis by Richard Bellman, Dover Publications
4. Differential Equations by Shepley L Ross, Wiley Publications

REFERENCE BOOKS:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
3. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
4. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
5. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
6. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
7. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
8. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

2014-15 **Code: 40501**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech. I Sem.

L	T/P/D	C
4	-/-/-	4

COMPUTER PROGRAMMING
Common to CE/EEE/ME/ECE/CSE/Mining

Objectives

1. Learn how to write modular, efficient and readable C programs
2. Declare and manipulate single and multi-dimensional arrays of the C data types.
3. Describe the techniques for creating program modules in C using functions and recursive functions.
4. Create and manage derived data types and perform operations on files.
5. Utilize pointers and dynamic memory allocation functions to efficiently solve problems.
6. To provide an overview on current technologies in Software Industry like Open Source-LINUX and PHP.

UNIT I

Computer fundamentals-Hardware, Software, Programming languages, Translators, Overview of Operating System, Program Development steps-Algorithm, Flow chart; Number Systems,

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

UNIT II

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

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

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

UNIT III

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

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

UNIT IV

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

Preprocessor Directives-include, define, etc., Dynamic Memory Allocation.

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.

UNIT V

Open Source: Introduction to Open Standard, Open Standards Model, Standards and Applications, Open Source Software and Technology.

Linux: History, Properties, Flavors, Introduction to file system, Basic commands and shell programming, Execution of c programs.

PHP: - History, Features of PHP, Key Driver of LAMP Stack, PHP Deployment Platform – Sample web site using PHP.

Outcomes:

Upon completion of the course, the students are expected to:

1. Write, compile and debug programs in C language.
2. Use different data types in a computer program.
3. Design programs involving decision structures, loops, arrays and functions.
4. Explain the difference between call-by-value and call-by-reference
5. Understand the dynamic allocation of memory by using pointers.
6. Use different file operations to create/update basic data files.
7. Use the basic commands of Linux
8. Able to create basic web pages using PHP Deployment

TEXT BOOKS:

1. Programming in C by Pradip Dey, Manas Ghosh – Second Edition, Oxford University Press.
2. C programming: A Problem-Solving Approach by Behrouz A. Forouzan, E.V.Prasad, Richard F.Gilberg – First Edition, Cengage Learning Press
3. C How to Program by Paul Deitel and Harvey Deitel – Seventh Edition, PH.
4. C Programming and Data Structures by E Balagurusamy, Second Edition, Tata McGraw Hill.
5. Introduction to Linux-A Beginner's Guide by Machtelt Garrels
6. Beginning PHP 5.3, by Matt Doyle, SPD/Wrox Press-2011

REFERENCE BOOKS:

1. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie – Second Edition, PH.
2. C Programming: Absolute beginner's guide by Greg Perry and Dean Miller, Third Edition, QUE Publishers.
3. Let Us C by Yashwant Kanetkar – Fifth Edition, BPB Publications.

2014-15 **Code: 40301**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech. I Sem.

L	T/P/D	C
2	1/3/-	4

ENGINEERING DRAWING – I

Pre-requisite: Mathematical Geometry

Objective: The objective of this subject is to provide the basic concepts about Engineering Drawing. Detailed concepts are given in projections, technical drawing, dimensioning and specifications

Codes/Tables: Nil

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing –

Lettering practice – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:

a) Conic Sections including the Rectangular Hyperbola – General method only.

b) Cycloid, Epicycloid and Hypocycloid

c) Involute.

UNIT – II

Orthographic Projections in First Angle

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

Projections of Points. Including Points in all four quadrants.

Projections of Lines - Parallel, perpendicular, inclined to one plan and inclined to both planes. True length and true angle of a line. Traces of a line.

UNIT – III

Projections of Planes: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

UNIT – IV

Projections of Solids: Projections of regular solids, cube, prisms, pyramids, tetrahedran, cylinder and cone, axis inclined to both planes.

UNIT – V

Isometric Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions –Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

Transformation Of Projections: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

Outcome: At the end of learning this course the student shall be able to understand the planes, lines, curves, projections, orthographic views, isometric views, sections of solids

TEXT BOOK:

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing - Basant Agrawal, TMH

REFERENCE BOOKS:

1. Engineering drawing - P.J. Shah.S.Chand.
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. international.
5. Engineering Drawing - Grower.
6. Engineering Drawing , Venugopal / New age.

2014-15 **Code: 40502**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech. I Sem.

L	T/P/D	C
-	-/-/3	2

COMPUTER PROGRAMMING LAB
(Common for all branches)

Objectives:

1. Gain practical knowledge of C programming to write modular, efficient and readable C programs by identifying the structural elements and layout of C source code.
2. Declare and manipulate single and multi-dimensional arrays of the C data types and derived data types like structures, unions.
3. Use functions from the portable C library and to describe the techniques for creating program modules using functions and recursive functions.
4. Manipulate character strings in C programs. Utilize pointers to efficiently solve problems.
5. Allocate memory to variables dynamically and Perform operations on text and binary files.
6. Learns basic commands of Linux
7. Learns basics of PHP

Week l:

Practice various DOS internal and external commands.

Week 2:

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

Week 3:

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

Week 4:

a) Write a C program to find the sum of individual digits of a positive integer.

b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.

d) Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.

Week 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.

Week 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

Week 7:

a) Write a C program that uses functions to perform the following operations:

i) To insert a sub-string in to 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.

Week 8:

a) Write a C program to construct a pyramid of numbers.

b) Write a C program to generate Pascal's triangle.

Week 9:

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+\ldots\ldots\ldots\ldots + x^n$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10:

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

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11:

a) Write a C program that uses functions to perform the following operations:

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers
(Note: represent complex number using a structure.)

b) Write a C program to find grades of a student's using structures and unions.

Week 12:

a) Write a C program which copies one file to another.

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

Week 13:

a) Practicing basic LINUX commands
b) Write simple shell programs

Week 14:

a) Develop a sample web Pages using PHP

Outcomes:

Upon completion of the course, the students are expected to:

1. Understand the basic terminology used in computer programming and to write, compile and debug programs in C language.
2. Design programs involving decision structures, loops ,arrays and functions.
3. Understand the dynamics of memory by the use of pointers.
4. Use different file operations to create/update basic data files.
5. Familiarizes with basics of LINUX and PHP

2014-15 **Code: 40C03**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem.

L	T/P/D	C
-	-/-/3	2

ENGINEERING CHEMISTRY LAB
List of Experiments (Any 10 of the following) :

Titrimetry:

1. Estimation of ferrous iron by dichrometry.

2. Estimation of hardness of water by EDTA method.

Mineral analysis:

3. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

Colorimetry:

4. Determination of ferrous iron in cement by colorimetric method

Conductometry:

5. Conductometric titration of strong acid vs strong base.

6. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

7. Titration of strong acd vs strong base by potentiometry.

8. Titration of weak acid vs strong base by potentiometry.

Physical properties:

9.Determination of viscosity of sample oil by redwood / oswald's viscometer.

10.Determination of Surface tension of lubricants.

Preparations:

11. Preparation of Aspirin

Kinetics:

12. To determine the Rate constant of hydrolysis of methyl acetate by an acid.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.

2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.,

2. A text book on experiments and calculation Engg. S.S. Dara.

3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications

2014-15 **Code: 40E03**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech. I Sem.

L	T/P/D	C
-	-/-/3	2

ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
(Common for all branches)

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

Objectives

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

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

To facilitate honing of listening and speaking skills of students

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

To develop confidence to face the audience and participate in activities

To help the students shed inhibitions and communicate with clarity

Listening Skills:

Objectives

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

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

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

• Listening for general content

• Listening to fill up information

• Intensive listening

• Listening for specific information

Speaking Skills:

Objectives

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

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

• Oral practice

• Describing objects/situations/people

• Just A Minute(JAM) Sessions.

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

UNIT– 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.

UNIT – 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.

UNIT- 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.

UNIT – 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

UNIT– V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer, Debate

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

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

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications: i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) 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: English Language Communication Skills laboratory Manual Published by Pearson, New Delhi 2012

Learning Outcomes:

1. Better Understanding of nuances of language through audio- visual experience and group activities

2. Neutralization of accent for intelligibility

3. Speaking with clarity and confidence thereby enhancing employability skills of the students

4. Good understanding of listening skills and speaking skills and their application in real life situations.

5. Good understanding of non-verbal communication and developing confidence to face audience, shed inhibitions.

Reference books.

1. Polyskills by Cambridge Foundation Course
2. Technical Communication by William Sanborn Pfeiffer and TVS Padmaja
3. English Language Communication, a Reader Cum Lab Manual Course Content and Practice by Dr. A Ramakrishna Rao, Dr. G. Natanam, Prof. S.A. Sankaranarayanan
4. A Course On English by K.R. Lakshminarayanan
5. Successful Presentations by John Hughes and Andrew Mallett
6. Oxford Word Skills, learn and Practise English Vocabulary by Ruth Gairns and Redman
7. Public Speaking Techniques, Speak Like a Winner by Akash Karia
8. The Art of Public Speaking by Stephen Lucas
9. Essential Communication Skills by Shalini Aggarwal, Linda Chapman
10. English Language Communication Skills, Lab Manual cum Workbook by Cengage Learning

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the college norms prescribed for the core engineering practical sessions.

2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned as an internal examiner and another member from examiners' list recommended by the BOS as an external examiner.

2014-15 **Code: 40E02**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem.

L	T/P/D	C
3	2/-/-	4

English & Professional Ethics
(Common to all branches)

INTRODUCTION:

There is an increasing concern over the English language competency of Engineering students based on their academic and professional performance. The transformation and the mistreatment of language in the social networking over the last decade have greatly affected the language skills of the students. In keeping with the language skill deficiencies, the present syllabus is designed to hone not only the traditional LSRW skills but also their analytical skills that enable to think too in English. This effective approach to develop English Language competency among the Engineering students aims to kindle the thinking skills to communicate effectively. The classroom activities based on the textbook may be used to build confidence among the students as they become active participants and teachers taking the role of a facilitator.

In the English classes, the focus is on the grammar, vocabulary, reading and, writing. For this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc. The focus is on language error detection as well as correction along with honing vocabulary, reading skills, and writing skills.

The text is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

This course also has a few elements on professional ethics and human values. It helps the students know their responsibility towards the society and instills in students, a sense of respect towards harnessing values of life and spirit of fulfilling social responsibilities

OBJECTIVES:

a. To facilitate for the improvement of the language proficiency of the students in English with emphasis on Reading and writing skills.

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

c. Analysing intensive reading strategies and discussing how to distinguish between facts and opinions and draw inferences.

d. Enable the students to improve effective writing skills.

f. To develop English Language communication skills in formal and informal situations.

g. To create an awareness on Engineering Ethics and Human Values.
h. To understand social responsibility of an engineer.
i. To appreciate ethical dilemma while discharging duties in professional life.
j. To mould the students to the needs of the world.

SYLLABUS:

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.

2. To develop the ability of students to guess the meanings of words from context and grasp the overall

message of the text, draw inferences etc.

• Skimming the text

• Understanding the gist of an argument

• Identifying the topic sentence

• Inferring lexical and contextual meaning

• Understanding discourse features

• Scanning

• Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill

2. To equip them with the components of different forms of writing, beginning with the lower order ones.

• Writing sentences

• Use of appropriate vocabulary

• Paragraph writing

• Coherence and cohesiveness

• Narration / description

• Note Making

• Formal and informal letter writing

- Circular writing
- Memo writing
- Report writing

TEXT BOOK PRESCRIBED:

Ignited Minds by A. P. J. Abdul Kalam, Penguin Books.

Ethics in Engineering by Mike Martin and Roland Schinzinger , McGraw-Hill.

The course content and study material is divided into seven Units.

UNIT-I

Chapters entitled "The Dream and the Message" and "Give Us a Role Model" from **Ignited Minds** by A.P.J. Abdul Kalam, Penguin Books.

Vocabulary: synonyms and antonyms.

Grammar: question tags, exercises related to questions.

Reading: Intensive Reading and Extensive Reading.

Writing: essay writing.

UNIT-II

Chapters entitled "Visionary Teachers and Scientists" and "Learning from Saints and Seers" from **Ignited Minds** by A.P.J. Abdul Kalam, penguin Books.

Vocabulary: words often confused, idioms and phrases

Grammar: degrees of comparison- exercises.

Reading**:** Reading for themes and gists

Writing: summarizing

UNIT-III

Chapters entitled "Patriotism beyond Politics and Religion" and "The Knowledge Society" from **Ignited Minds** by A.P.J. Abdul Kalam, , Penguin Books.

Grammar: types of sentences, transformation of sentences- simple , complex and compound sentences.

Vocabulary: one word substitutions.

Reading: reading for interpretation

Writing. Writing instructions

UNIT-IV

Chapters entitled "Getting the Forces Together" and "Building a New State" from **Ignited Minds** by A.P.J. Abdul Kalam, , Penguin Books.

Grammar: Conditionals- exercises.

Vocabulary: e-register, foreign expressions.

Reading: critical reading.

Writing: memo writing, review writing

UNIT-V

Chapter entitled "To My Countrymen" from **Ignited Minds** by A.P.J. Abdul Kalam, , Penguin Books.

Grammar: Common errors and integrated exercises.

Vocabulary: gender sensitive language, integrated exercises in vocabulary.

Reading: survey, question, read, recall and review.

Writing - Note-making, Report writing, types of reports

UNIT- VI

Introduction to Engineering Ethics- Definition; Purpose of studying Ethics in Engineering. Engineers as Social Experimenters and Safety Officers, Learning from the past, Knowledge gained, Responsible Experimenters, Accountability, Assessment of Safety and Risk, Risk benefit analyses and reducing risk.

- Field work could be assigned to the students- interaction with the "real" Safety Officers

UNIT –VII

Responsibilities to Employers, Respect for Authority, confidentiality; conflicts of interest-Impairment of Judgment & Service, Gifts & Bribes, Moral Status; Occupational crime, Antidiscrimination Laws, Sexual harassment, Global Issues;

Engineers- Leaders, Environmental/ Bio ethics, Computer Ethics, Hacking, Cyber Crime, Engineers as Managers, Moral Leadership

- Field work could be assigned – take up a role of a leader and work on any issue.

*unit VI&VII are to be tested only for internal evaluation. They are not meant for end semester examination.

*midterm I will cover unit1-3, midterm II will cover unit4-7.

* project based on field work in teams will carry 5marks.

LEARNING OUTCOMES:

1. Usage of English Language, written and spoken.

2. Enrichment of comprehension and fluency

3. Improving effective writing skills in personal and professional life.

4. The learners recognise ethical responsibilities of engineers and suggest ways to deal with ethical issues in engineering.
5. The learners can reach an ethically justified or morally reasoned practical solution to an ethical problem with an appropriate plan of action.

REFERENCE BOOKS:

1.Sharon J. Gerson Steve M. Gerson, "Technical Writing", New Delhi, Pearson education
2. Professional Report Writing by Simon Mort

3. Cambridge English for Engineering : Student's Book, Mark Ibbotson , PB + 2 ACD, ISBN:

4. English for Engineers, Regional Institute of English; Bangalore, PB + CD - ROM, ISBN:

5. Resonance: English for Engineers and Technologists, Dr. K. Elango; Dr. Veena Selvam; Dr. P. R. Sujatha Priyadarshini,

6. A Course in Communication Skills, P Kiranmai Dutt ; Geetha Rajeevan ; C.L.N. Prakash , PB

7. Developing Language and Communication Skills through Effective Small Group Work : SPIRALS: From 3-8, Marion Nash ; Jackie Lowe ; Tracey Palmer , PB

8. Technical Report Writing Today by Daniel G Reordan
9.Comprehension Connections: Bridges to Strategic Reading by Tanny McGregor

10. Keys to Comprehension: How to Help Your Kids Read It and Get It! By Susan Zimmermann

11.Deeper Reading by Kelly Gallagher

12.Notice and Note: Strategies for Close Reading by Kylene Beers

13.Cambridge English Skills Real Reading 3 with Answers by Liz Driscoll

14.Inferences & Drawing Conclusions: 35 Reading Passages for Comprehension by Linda Ward Beech

2014-15 **Code: 40P02**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem.

L	T/P/D	C
3	-/-/-	3

ENGINEERING PHYSICS – II
(Common to all branches)

Objectives:

1. To teach the students the phenomenon of Interference, Diffraction and Polarization.
2. To make the students aware of X – ray diffraction and different techniques of it.
3. To make the students understand the characteristics of LASER, different working LASERs.
4. To teach various applications of LASERs.
5. To teach the students, basic definitions related to Dielectric materials, different kinds of polarization, and different Dielectric materials.
6. To introduce them the phenomenon of superconductivity and its applications.
7. To teach the students the significance of nano size and its fascinating applications.
8. To teach the students working principle of optical fiber, classification of optical fibers and applications of optical fibers.
9. To teach the production and detection of ultrasonics and their applications.

UNIT – I

Optics: Introduction to Interference, Young's double slit experiment (Qualitative) – Optical path difference and Fringe width – Interference in thin films (Reflected light) Cosine law – Newton's rings experiment – Determination of wavelength of light .
Basic Principles of X – ray diffraction - Bragg's Law, Bragg's X-Ray Spectrometer. Laue Method, Powder Method.
Introduction to Polarization, Polarization of Light, Plane of Polarization, Double Refraction, Nicols's prism.

UNIT – II

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; Semiconductor Diode LASER; Applications of LASER – Data storage, Medical, Scientific and industrial

UNIT – III

Dielectric Properties:
Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector; Electronic, Ionic and Orientation Polarizations; Expressions for electronic and ionic Polarizabilities; Qualitative treatment of Internal Field in dielectrics; Clausius - Mossotti Equation; Piezo-electricity and Ferro- electricity
Superconductivity: Concept of Perfect Diamagnetism; Meissner effect – Magnetic levitation; Type I and II Superconductors; Applications of Superconductors

UNIT – IV

Nano Technology: Introduction, Surface to volume ratio, Quantum confinement, Change of Electrical, magnetic and optical properties with size, Synthesis of nano materials – Sol-gel method, PVD; Characterization by TEM, applications.
Fiber Optics: Principle of Optical Fiber; Acceptance angle and Acceptance cone, Numerical Aperture; Step and Graded index Optical Fibers and their Refractive Index profiles; Attenuation in Optical Fibers, Application of Optical Fibers – Medical, Level sensor and Communication system.

UNIT –V
Ultrasonics: Introduction, Production of Ultrasonic waves – Magnetostriction method, Piezo electric method; Detection of ultrasonics – Piezo electric detector, Kundt's tube, Sensitive flame method, Thermal detector; Properties of Ultrasonic waves; Applications – Communication, Industrial, Biological and medical;
Acoustics: Basic requirements of acoustically good Hall; Reverberation; Sabine's formula for Reverberation Time (Qualitative Treatment); Factors Affecting the Architectural Acoustics and their Remedies

Outcomes:

1. Students get introduced to the phenomenon of interference and understand the very famous Young's double slit experiment and Newton's rings experiment.
2. They shall understand the concept of X – ray diffraction and the two techniques Laue method and Powder method.
3. Students shall understand the theory of Double refraction as far as Polarization phenomenon is concerned.
4. Students shall be able to distinguish ordinary light and LASER. They shall learn the physics behind the production of LASER.
5. They shall understand and appreciate the applications of LASER.
6. The students shall be able to distinguish Electronic, Ionic and orientation polarizations, understand the significance of the Clausius – Mossotti relation.
7. The students shall learn regarding Piezo electric materials also.
8. They shall learn Meissner effect and be able to understand the classification of superconductors into two categories.
9. They shall be able to understand and appreciate the applications of Superconductivity.
10. Students shall understand the influence of size of the material on its properties.
11. Students shall understand the concept of total internal reflection based on which optical fibers work and understand the concepts of acceptance angle and numerical aperture.
12. They shall understand and appreciate various diversified applications of optical fibers like medical application, application in instrumentation and application in communication.
13. They shall be able to understand various methods of production and detection of ultrasonics besides learning their applications.
14. They shall get acquainted with the basic concepts of acoustics.

TEXT BOOKS:

1. Modern Engineering Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd

2. Engineering Physics – P.K.Palanisamy - SciTech Publications Pvt. Ltd., 5th Print 2008.

3. Applied Physics – S.O. Pillai & Sivakami-New Age International (P) Ltd., 2nd Edition 2008.

4. Unified Physics Vol – I by S L Gupta and Sanjeev Gupta JNPN Publications.

5. Unified Physics Vol – II by S L Gupta and Sanjeev Gupta JNPN Publications.

6. Engineering Physics by B K Panedy, S Chaturvedi, Cengage learning

7. A Text book of Optics by N Subrahmanyam, Brijlal and M N Avadhanulu, S Chand & Co,

REFERENCE BOOKS:

1. Solid State Physics – M. Armugam (Anuradha Publications).

2. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).

3. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).

4. Engineering Physics by R K Gaur and S L Gupta, Dhanpat Rai and Sons.

5. Solid State Physics – A.J. Dekker (Macmillan).

6. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).

7. A text book of Engineering Physics – S.P. Basvaraju – Subhas store

8. Electricity and magnetism by Edward Purcell – Berkeley series vol 2

9. Physics Vol 2 – Resnick, Halliday & Krane – Fifth edition, Wiley Student edition.

2014-15 **Code: 40C02**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem.

L	T/P/D	C
3	-/-/-	3

ENGINEERING CHEMISTRY – II
(Common for CE, EEE, ME, ECE, CSE & Mining)

Objectives:

1. Understand various techniques involved in polymerization and application of polymer technology in the area of various engineering fields and manufacturing process of important metallurgical materials.
2. Describe the fundamental aspects of colloids, surface chemistry and properties of multi-phase systems
3. Understanding how light interacts with matter and how it can be used to quantitatively understand chemical samples & engineering materials.
4. To learn about types of fuels and their characteristics, and combustion systems with emphasis on engineering applications.

UNIT- I

Polymers-I : Classification of Polymers, Types of Polymerization (Chain (Free radical Mechanism) & Step growth). Plastics**:** Thermoplastic & Thermo setting resins, Compounding & fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon and Bakelite.Fibers- Charcterstics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications.

UNIT-II

Polymers-II

Rubbers – Natural rubber and its processing (vulcanization). Elastomers – Buna-s, Butyl rubber. Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. Bio-degradable Polymers- preparation and Applications of Poly vinyl acetate and Poly lactic acid .Liquid Crystal Polymers and its Application.

UNIT- III

Photochemistry And Spectroscopy

Photochemistry: Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law. Quantum efficiency – determination Spectroscopy: Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. UV-visible spectroscopy – principles, instrumentation and Applications (Block diagram only).

UNIT-IV

Phase Rule & Surface Chemsitry

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 System. **Adsorption**: Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption. **Colloids**: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

UNIT-V:

Fuels & Combustion

Fuels – Classification – soild fuels: coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Fischer-Tropsch's process: Gaseous fuels - constituents, characterstics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus.**Combustion** – Definition, Calorific value of fuel – HCV, LCV; Determination of calorific value by Junker's gas calorimeter – Numerical problems on combustion.

Outcomes:

As an outcome of completing this course, students will:

1. Ability to practice professional chemical - polymer engineering knowledge for sustainable development.
2. The student will obtain an understanding of interactions between surfaces and gases, liquids or solutions, and how interfaces are important in many technological and biological processes.
3. Students will use spectroscopic data to make meaningful observations about the chemical properties of compounds.
4. Understand and analyze the combustion mechanisms of various fuels

TEXT BOOKS

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi /CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006)
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. 3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006)
4. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.

2014-15 **Code: 40M02**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem.

L	T/P/D	C
4	-/-/-	4

MATHEMATICS – II
(Differential, Vector Calculus & Numerical Techniques)
Common for all

Objectives:

Learning Objectives:

1. In engineering applications, data collected from the field are usually discrete and the physical meanings of the data are not always well known. To estimate the outcomes and, eventually, to have a better understanding of the physical phenomenon, a more analytically controllable function that fits the field data is desirable.
2. The process of estimating the outcomes in between sampled data points is called interpolation; whereas the process of estimating the outcomes beyond the range covered by the existing data is called extrapolation.
3. Understand the Rolles' theorem using intermediate value theorem ,Mean using Lagrange Mean Value theorem ,Cauchy Mean value theorem
4. Understand the beta function and relation between beta and gamma functions, Applications of beta, gamma functions in finding areas etc., Applications of integration in Cartesian, Parametric & Polar co-ordinates ,Evaluation of double integrals, Evaluation of triple integrals.
5. Vector calculus studies various differential operators defined on scalar or vector fields, which are typically expressed in terms of the Del operator (∇), also known as "nabla". The five most important differential operations in vector calculus are: (a) Grad (b) Div (c) Curl (d) Vector Laplacian (e) Laplacian. , Green's theorem is mostly used to solve two-dimensional flow integrals, stating that the sum of fluid outflows at any point inside a volume is equal to the total outflow summed about an enclosing area. In plane geometry, and in particular, area surveying.
6. Green's theorem can be used to determine the area and centroid of plane figures solely by integrating over the perimeter. In vector calculus, the divergence theorem, also known as Gauss's theorem, is a result that relates the flow (that is, flux) of a vector field through a surface to the behavior of the vector field inside the surface.

UNIT – I

Differential Calculus: Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem .

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

UNIT – II

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences –Central differences – Symbolic relations and separation of symbols- Difference Equations - 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.

UNIT – III

Solution of Non- linear Systems, Special Functions

Introduction : Solution of Algebraic and Transcendental Equations, The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

Beta and Gamma Functions: Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions

UNIT – IV

Multiple Integrals: Multiple integrals - double and triple integrals – change of variables – change of order of integration – Finding Surface areas, volumes

UNIT – V

Vector Calculus: Gradient- Divergence- Curl and their related properties of sums- products- Laplacian and second order operators. Vector Integration - Line integral – work done – Potential function – area- surface and volume integrals Vector integral theorems: Green's theorem-Stoke's and Gauss's Divergence Theorem (With out proof). Verification of Green's - Stoke's and Gauss's Theorems.

Outcomes:

1. Understands the geometrical interpretation of Rolle's, Lagrange's, Cauchy Mean value theorems,
2. Understands the Taylors theorem, Understands applications of Taylor theorem in complex analysis, understands the geometrical interpretation of all the forms of remainders, Understands the maximum and minimum concept with and without constraints.
3. Learns about the solution of transcendental equations, Understands geometrical meaning of the solution of the curves.
4. Student learn about the interpolation process, He can find the interpolating polynomial function for the given data. Student understands how to find the unknown values of y wrt x values
5. Learn about vecor and scalar fields, Grad, div and Curl and their applications and properties,
6. Study about Solenoidal and irrotational vectiors with scalar potential function.Vector integration like - Line integral, Surface and Volume integrals and their Evaluations. Study about Integral Theorems Like –Green's , Gauss's and Stokes's theorem's and their verifications

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering by Kanti B.Datta ,Cengage Learning
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Numerical Methods using MATLAB by John H Matthews, Kurt D Fink, Pearson Education
4. Numerical Methods, Jain, SRK Iyyengar Narosa Publications

REFERENCE BOOKS:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
3. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
4. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
5. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
6. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
7. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
8. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

2014-15 **Code: 40302**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem. **L T/P/D C**
3 1/-/- 4

ENGINEERING MECHANICS

Pre-requisite: Applied Physics

Objective: : The objective of this subject is to provide the basic concepts

Codes/Tables: Nil

UNIT – I
Introduction to Engineering Mechanics – Basic Concepts, Laws of Motion, Force-types, characteristics- Principle of transmissibility.
Systems of Forces: Classification**,** Coplanar Concurrent Forces – Components of force in Space – Resultant- Triangle law of Forces-Polygon law of Forces- Parallelogram Law of Forces-Resolution and composition of Forces– Coplanar Non-Concurrent System of Forces, Resultant of Parallel system of Forces -Moment of Force and its Application – Varignon's theorem, Couples.

UNIT – II
Equilibrium of Systems of Forces: Free Body Diagrams, Types of Supports and their reactions, Internal and External Forces - Types of Equilibrium, Equations of Equilibrium, Conditions of Equilibrium, Equilibrium of bodies under Coplanar concurrent system of forces – Lami's Theorem, Converse of the law of Triangle of forces, converse of the law of polygon of forces. Equilibrium of Spatial Systems for concurrent forces.

UNIT – III
Centroid: Centroids of Lines and Areas (from basic principles) –simple figures– Centroid of Composite Figures-Centroid of L, T, I, Z and channel Sections.

Centre of Gravity: Centre of gravity of simple solids (from basic principles), centre of gravity of composite solids, Pappu's-Guldinu's theorems.

Area moment of Inertia : Definition –Moment of inertia of plane areas, Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Moment of Inertia of Sections, Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Simple solids, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – IV
Kinematics: Rectilinear motion – Motion of Rigid Body under uniform and variable accelerations – motion under gravity-curvilinear motion -Projectiles-rotary motion, kinematics of general plane motion.

Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation – D'Alemberts Principle – Connected bodies- Kinetics of rotating bodies- Equations of Plane Motion– Rolling Bodies.

UNIT – V
Work, Power and Energy: Work-energy equation for translation-connected bodies on horizontal and inclined planes-pulleys-Work done by a spring-Work-energy equation to rotary motion and general plane motion.

Impulse-Momentum principle: Linear impulse and momentum-connected bodies-force of jet on a vane-pile & hammer.

Outcome: At the end of this course, the student shall be able to understand the basic concepts of force, moment, couple, resultant forces, loads, supports, Lamis' theorem, Newton's theorem, De Alemrt's theorem for work-energy principles.

TEXT BOOKS:

1. Engineering. Mechanics / Timoshenko & Young.

2. Engineering. Mechanics / S.S. Bhavikatti & J.G. Rajasekharappa

3. Engineering. Mechanics / D.S.Kumar

REFERENCES BOOKS:

1. Engineering Mechanics / Fedinand . L. Singer / Harper – Collins.

2. Engineering Mechanics / K. Vijaya Kumar Reddy / J. Suresh Kumar

3. Engineering. Mechanics / R.V. Kulkarni & R.D. Askhevkar

4. Engineering. Mechanics /R.S. Khurmi / S.Chand.

5. Engineering. Mechanics / K L Kumar / Tata McGraw Hill

2014-15 **Code: 40303**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem.

L	T/P/D	C
2	-/3/-	4

ENGINEERING DRAWING – II

Pre-requisite: Mathematical Geometry

Objective: The objective of this subject is to provide the basic concepts about Engineering Drawing. Detailed concepts are given in projections, technical drawing, dimensioning and specifications

Codes/Tables: Nil

UNIT-I

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

UNIT-II

Sections And Sectional Views: Right Regular Solids – Prism, Cylinder, Pyramid, Cone .

Intersection Of Solids:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone

UNIT – III

Development Of Surfaces: Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

UNIT – IV

Perspective Projections: Perspective View: Points, Lines, Plane and solids Figures.

UNIT – V

Auto Cad Commands:-Basic Draw Commands, Display Commands, Editing Commands Construction Commands

Outcome: At the end of learning this course the student shall be able to understand the planes, lines, curves, projections, orthographic views, isometric views, sections of solids

TEXT BOOK:

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing - Basant Agrawal, TMH

REFERENCE BOOKS:

1. Engineering drawing - P.J. Shah.S.Chand.
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. international.
5. Engineering Drawing - Grower.
6. Engineering Drawing , Venugopal / New age.

2014-15 **Code: 40P03**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem.

L	T/P/D	C
-	-/-/3	2

ENGINEERING PHYSICS LAB

Objectives:

1. To motivate the student to gain experimental skills, working with various measuring instruments.
2. To learn the basic circuit designing concepts.

(Any Ten experiments compulsory)

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

Laboratory manual:

Engineering Physics Practicals by Dr.B.Srinivasa Rao, KesavaVamsiKrishna.V, K.S.Rudramamba.

(University Science Press

Outcome:

1. Various experiments related to Optics, Mechanics, Electrical and Electronics areas help the student understand the subtle concepts in a practical way.
2. Also the labs sessions inculcate the sense of team work.
3. Working with various measuring instruments help the student gain experimental skills.
4. Interpretation and analysis of data are also learnt by the student.

2014-15 **Code: 40304**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech II-sem. **L T/P/D C**
- -/3/- 2

AUTO CAD & ENGINEERING MECHANICS LAB
(Common for CE, ME, Mining Engg)

A. Engineering Mechanics Lab

1. Verification of law of co-planar concurrent forces.
2. Equilibrium of coplanar concurrent force system-forces in the jib crane.
3. Determine the support reaction for a beam
4. Determine the moment of inertia of a flywheel.
5. Statics experiment on equilibrium
6. Dynamics experiment on momentum conservation.

B. Auto CAD Lab

1. Drafting: Development of part drawings for various components in the form of orthographic and isometric using Auto Cad Package. Representation of dimensioning and tolerances scanning and plotting. (From a given list of 6 Tutorials of 2D Drawing).

2014-2015 **code: 40305**

MALLAREDDY ENGINEERING COLLEGE
(Autonomous)

I Year B.Tech CSE – I Sem

L	T/P/D	C
-	- / 3 / -	2

ENGINEERING & IT WORKSHOP
Common to CE/EEE/ME/ECE/CSE/Mining

ENGINEERING WORKSHOP

Pre-requisite: Nil

Objective: The objective of this subject is to provide the basic concepts about tools used in different trades like Fitting, Carpentry, House wiring, Tin smithy etc in Engineering Workshop.

Codes/Tables: Nil

1. Trades for Exercises:

At least two exercises from each trade:

a) Carpentry
b) Fitting
c) Tin-Smithy and Development of jobs carried out and soldering.
d) House-wiring.
e) Foundry.

2. **Trades for Demonstration**

a) Machine shop
b) Plumbing

Outcome: At the end of this course the students shall be capable to do house wiring, tinsmith, fitting, foundry, carpentry and do some maintenance of wooden furniture. This subject/ practice keep the students a habit of life-long learning

TEXT BOOKS:

1. Work Shop Manual – P. Kanniah/ K. L. Narayana, Scitech Publishers.
2. Work Shop Manual by Venkat Reddy/B.S. Publications
3. Work Shop Practice Manual by K. Venkat Reddy,/B.S. Publications

IT WORKSHOP

Objectives:

1. To study/demonstrate the concepts of computer w.r.t. its hardware, operating system, assembling and disassembling.

2. To conduct the experiments related to IT Workshop, installations

List of Tasks:

1. Computer Hardware: Identification of Peripherals
2. Assembling and disassembling of a PC
3. Simple diagnostic exercises – Related to hardware
4. Installation of Windows Operating System
5. Installation of Linux Operating System
6. Simple diagnostic exercises –Related to Operating System

7. Design the applications using following features of MS Word
   a) Letter
   b) Header and footer
   c) Hyperlink, Bullets and numbering
   d) Inserting various objects
   e) Spelling and grammar checking
   f) Tables
   g) Mail merge
8. Design the applications using following features of MS Excel

   a)Formulas

   b)Functions

   c)Conditional formatting

   d)Sorting

   e)Filters

9. Design the applications using following features of MS Powerpoint

   a) Design Templates

   b) Layouts

   c) Inserting Objects

   d) Custom Animation

   e) Macros

10. Designing the same applications(8,9 & 10) using Open Office.

Outcomes:

Students will be able to:

1. Identify, assemble, dissemble, install and
2. Write commands for a given configuration of a computer.
3. Familiarizes with MS Word, Excel, Power Point and Open Office.

TEXTBOOKS:

1. IT Essentials PC Hardware and Software Companion Guide Third Edition by Davis Anfinson and Ken Quamme CISC Press, Pearson Education.
2. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft).

2014-15 **Code: 40306**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME – I Sem **L T/P/D C**
- 6/ - /- 4

MACHINE DRAWING

Pre-requisite: Engineering Drawing

Objective: The objective of this subject is to provide the basic concepts of machine components and practice of assembly and part drawings.

Codes/Tables: Nil

Machine Drawing Conventions:

Need for drawing conventions - introduction to IS conventions

a) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.
b) Types of sections - selection of section planes and drawing of sections and auxiliary sectional views. Parts not usually sectioned.
c) Methods of dimensioning, general rules for sizes and placement of dimensions for holes, centers, curved and tapered features.
d) Title boxes, their size, location and details - common abbreviations & their liberal usage
e) Types of Drawings - working drawings for machine parts.

I. Drawing of Machine Elements and simple parts:

Selection of Views, additional views for the following machine elements and parts with every drawing proportion.

a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
b) Keys, cottered joints and knuckle joint.
c) Rivetted joints for plates
d) Shaft coupling, spigot and socket pipe joint.
e) Journal, pivot and collar and foot step bearings.

II. Assembly Drawings:

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

a) Engine parts - stuffing boxes, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.
b) Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.
c) Valves: Steam stop valve, spring loaded safety valve, feed check valve and air cock.

NOTE: First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

Outcome: The student will be able to study, prepare and check the assembly drawings of different engine parts, and other machine parts.

TEXT BOOKS:

1. Machine Drawing /K.L.Narayana, P.Kannaiah & K. Venkata Reddy / New Age Publishers
2. Machine Drawing /Dhawan/ S.Chand Publications

REFERENCE BOOKS:

1. Machine Drawing/ N.D.Bhatt/Charotar Publishing House
2. Machine Drawing/ P.S.Gill/ S.K. Kataria & Sons publisher
3. Machine Drawing/ Rajput/Lakshmi Publications

2014-15 **Code: 40M05**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME – I Sem

L	T/P/D	C
4	- / - /-	4

PROBABILITY & STATISTICS

Objectives:
To learn

1. Understand a random variable that describes randomness or an uncertainty in certain realistic situation.
2. It can be of either discrete or continuous type.
3. In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
4. Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
5. The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
6. The mechanism of queuing system. The characteristics of queue. The mean arrival and service rates
7. The expected queue length, The waiting line
8. The random processes, The classification of random processes, Markov chain, Classification of states
9. Stochastic matrix (transition probability matrix), Limiting probabilities, Applications of Markov chains

UNIT-I

Single Random variables and probability distributions: Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

UNIT-II

Multiple Random variables, Correlation & Regression: Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation. Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

UNIT-III

Sampling Distributions and Testing of Hypothesis

Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of

Sample mean and varience, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of varience.

Parameter estimations – likelihood estimate, interval estimations.

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test,

Large sample tests:

(i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known varience & unknown varience, equal and unequal variances)

(ii) Tests of significance of difference between sample S.D and population S.D.

(iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

Small sample tests:

Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples, Snedecor's F- distribution and it's properties. Test of equality of two population variances, Chi-square distribution, it's properties, Chi-square test of goodness of fit

UNIT-IV

Queuing Theory: 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 Model of infinite queue, M/M/1 model of finite queue.

UNIT-V

Stochastic processes: Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

Outcomes:

1. Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
2. The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations .It is
3. Mainly useful for non-circuit branches of engineering.
4. The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
5. The student would able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and
   the probabilities in nth state. It is quite useful for all branches of engineering

TEXT BOOKS:

1. Probability & Statistics for Engineers & Scientists –Walpole Myers Myers Ye
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
3. Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press
4. Operations Research by S.D. Sarma,

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B.Datta and M.A S.Srinivas,Cengage Publications
2. Probability and Statistics by T.K.V.Iyengar & B.Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K.Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay l.Devore.

2014-15 **Code: 40230**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME – I Sem **L T/P/D C**
4 -/ - /- 4

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CSE, IT, MECH, MINING, CIVIL)

UNIT – I

Introduction To Electrical Engineering: Electric field; electric current, potential and potential difference, electromotive force, electric power, ohm's law, basic circuit components, electromagnetism related laws, Faradays laws of electromagnetic induction. Types of induced EMF's, Kirchhoff's laws, Simple problems.

Network Analysis: Basic definitions, types of elements, types of sources, resistive networks, inductive networks, capacitive networks, series, parallel circuits, star- delta and delta - star transformation Network theorems- Superposition, Reciprocity, Thevenins's, Nortons & Maximum power transfer theorems and simple problems.

UNIT-II

Magnetic Circuits: Basic definitions, analogy between electric and magnetic circuits.

Transformers: Principles of operation, Constructional Details, EMF equation, OC and SC test on transformer simple problems.

UNIT-III

D.C Machines: Principle of operation of D.C machines, armature windings, e.m.f equation in a D.C machine, Torque production in a D.C machine, Operation of a D.C machine as a generator, operation of a D.C machine as a motor.

A.C Machines: principle of operation, slip and rotor frequency, torque (simple Problems).

UNIT - IV

Diode And It's Characteristics: P-N junction diode, symbol, V-I Characteristics, Diode Applications, Zener diode characteristics Rectifiers – Half wave, Full wave and Bridge rectifiers with filters and without filters(simple Problems)

Transistors: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications

UNIT V

Cathode Ray Oscilloscope: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

Oscillators: Condition for oscillations. RC-phase shift oscillators with Transistor , Hartley and Colpitts oscillators, Wein bridge oscillator,

TEXT BOOKS:

1. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin/Pearson.

2. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand & Co.

REFERENCE BOOKS:

1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.

2. Basic Electrical Engineering by Kothari and Nagarath, TMH Publications, 2nd Edition

2014-15 **Code: 40307**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME – I Sem **L T/P/D C**
4 1/ - /- 4

MECHANICS OF SOLIDS

Pre-requisite: Engineering mechanics, Material Science

Objective: The objective of this subject is to provide the basic concepts of mechanical behavior of the different materials of the objects when they are subjected to different loads.

Codes/Tables: Nil

UNIT – I

Simple Stresses & Strains : Elasticity and plasticity – Types of stresses & strains–Hooke's law – stress – strain diagram for ductile and brittle material – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Elastic modulii & the relationship between them – Bars of varying section – composite bars – Temperature stresses .Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT – II

Shear Force And Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Bending Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

Shear Stresses: Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T and angle sections.

UNIT – IV

Deflection of Beams : Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U.D.L - uniformly varying load.

Torsion: Theory of pure torsion - Assumptions – Derivation of torsion equation, polar section modulus – power transmitted by shafts – combined bending and torsion.

UNIT – V

Analysis of Pin-Jointed Plane Frames: Determination of Forces in members of plane, pin jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever& simply–supported trusses-by method of joints & method of sections.

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in dia, and volume of thin cylinders – Riveted boiler shells.

Outcome: The student shall be able utilize the mechanics of solids in day –to -day life for designing simple structures and for other limited applications.

TEXT BOOKS:

1. Strength of Materials/S.Timshenko/ D. Van Nostrand Company, inc., 1941

2. Strength of materials/Ramamrutham/Dhanpat Rai Publishing Company.

REFERENCE BOOKS:

1. Strength of Materials/Jindal/ Umesh Publications.

2. Analysis of structures/Vazirani and Ratwani/ Khanna Publishers

3. Mechanics of Structures Vol-III/ S.B.Junnarkar/ Charotar Publishing House Pvt. Ltd.

4. Strength of materials/ Bhavikatti/ Lakshmi publications

5. Strength of Materials /Andrew Pytel and Ferdinond L. Singer Longman.

6. Solid Mechanics/ Popov / Prentice Hall Publisher

2014-15 **Code: 40308**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME I-Sem

L	T/P/D	C
4	1/-/-	4

THERMODYNAMICS

Pre-requisite: Applied Physics

Objective: The objective of this subject is to provide the basic concepts of work done & energy of different processes and their applications.

Codes/Tables: Steam Tables and Mollier charts, Refrigeration tables

UNIT I

Introduction: Basic Concepts : System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State and in Transition, Types, Work and Heat, Point and Path function.

Zeroth Law of Thermodynamics – Concept of quality of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale – PMM I - Joule's Experiments – First law of Thermodynamics – Corollaries – First law applied to a Process – applied to a flow system – Steady Flow Energy Equation.

UNIT – II

Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase – Energy Equation, Availability and Irreversibility – Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations – Elementary Treatment of the Third Law of Thermodynamics.

UNIT – III

Perfect Gas Laws – Equation of State, specific and Universal Gas constants – various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy – Throttling and Free Expansion Processes – Flow processes – Deviations from perfect Gas Model – Vander Waals Equation of State – Compressibility charts – variable specific Heats – Gas Tables.

Pure Substances, p-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations – Triple point at critical state properties during change of phase, Dryness Fraction – Clausius – Clapeyron Equation Property tables. Mollier charts – Various Thermodynamic processes and energy Transfer – Steam Calorimetry.

UNIT – IV

Power Cycles : Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Ericcson Cycle, Lenoir Cycle – Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis – comparison of Cycles.

Mixtures of perfect Gases – Mole Fraction, Mass friction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction , Volume fraction and partial pressure, Equivalent Gas const. And Molecular Internal Energy, Enthalpy, sp. Heats and Entropy of Mixture of perfect Gases and Vapour, Atmospheric air -

UNIT V

Refrigeration Cycles: Brayton and Rankine cycles – Performance Evaluation – combined cycles, Bell- Coleman cycle, Vapour compression cycle-performance Evaluation.

Introduction to Psychrometry: Psychrometric Properties – Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature, Thermodynamic Wet Bulb Temperature, Specific Humidity, Relative Humidity, saturated Air, Vapour pressure, Degree of saturation – Adiabatic Saturation, Carrier's Equation – Psychrometric chart.

Outcome: The students shall be able to know the conversion of energy to mass and vice versa of different processes

TEXT BOOKS:

1. Thermodynamics an Engineering Approach /Yunus Cengel & Boles /TMH

2. Engineering Thermodynamics / PK Nag /TMH, III Edition

REFERENCE BOOKS:

1. Engineering Thermodynamics/ Jones & Dugan/ Prentice Hall Publisher

2. Thermodynamics /J.P.Holman / McGrawHill

4. An introduction to Thermodynamics / YVC Rao / New Age Publications

5. Engineering Thermodynamics /K. Ramakrishna / Anuradha Publishers.

6. Fundamentals of Thermodynamics/ Sonntag, Borgnakke and van wylen / John Wiley & sons (ASIA) Pte Ltd.

2014-15 **Code: 40309**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME I-Sem **L T/P/D C**
4 1/- / - 4

METALLURGY AND MATERIALS SCIENCE

Pre-requisite: Applied Chemistry

Objective: The objective of this subject is to provide the basic concepts of composition of different materials and their mechanical properties and applications.

Codes/Tables: Nil

UNIT – I

Structure of Metals: Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the mechanical properties of metal / alloys – determination of grain size.

Constitution of Alloys: Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT -II

Equilibrium of Diagrams : Experimental methods of construction of equilibrium diagrams, Isomorphous alloy systems, equilibrium cooling and heating of alloys, Lever rule, coring miscibility gaps, eutectic systems, congruent melting intermediate phases, peritectic reaction. Transformations in the solid state – allotropy, eutectoid, peritectoid reactions, phase rule, relationship between equilibrium diagrams and properties of alloys. Study of important binary phase diagrams of Cu-Ni-, Al-Cu, Bi-Cd, Cu-An, Cus-Sn and Fe-Fe3C.

UNIT -III

Cast Irons and Steels: Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, tool and die steels.

UNIT – IV

Heat treatment of Alloys: Effect of alloying elements on Fe-Fe3C system, Annealing, normalizing, Hardening, TTT diagrams, tempering, Hardenability, surface - hardening methods, Age hardening treatment, Cryogenic treatment of alloys.

Non-ferrous Metals and Alloys: Structure and properties of copper and its alloys, Aluminum and its alloys, Titanium and its alloys.

UNIT – V

Ceramic materials: Crystalline ceramics, glasses, cermaets, abrasive materials, nano materials –definition, properties and applications.

Composite materials: Classification of composites, various methods of component manufacture of composites, particle – reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal – matrix composites and C – C composites.

Outcome: This subject knowledge is very useful to the students to choose the appropriate materials for different applications in manufacturing processes.

TEXT BOOKS:

1. Introduction to Physical Metallurgy / Sidney H. Avener/Tata McGraw Hill Edition

2. Essential of Materials science and engineering/ Donald R.Askeland/Thomson

3. Elements of Material science / V. Rahghavan/PHI Publications

REFERENCE BOOKS:

1. Material Science and Metallurgy/kodgire/Everest Publishing House

2. Science of Engineering Materials / Agarwal/Tata McGrawHill Edition

3. Materials Science and engineering / William and collister.

4. An introduction to materialscience / W.g.vinas & HL Mancini

5. Material science & material / C.D.Yesudian & harris Samuel

6. Engineering Materials and Their Applications/R. A Flinn and P K Trojan / Jaico Books.

7. Engineering materials and metallurgy/R.K.Rajput/ S.Chand Publisher

2014-15 **Code: 40231**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME I-Sem **L T/P/D C**
0 -/3/- 2

ELECTRICAL AND ELECTRONICS ENGINEERING LAB
(Common to CSE, IT, MECH, MINING)

Any 5 experiments to be done from Section A

Section A: Electrical Engineering:

1. Verification of Superposition and Reciprocity theorems.

2. Verification of maximum power transfer theorem. Verification on AC and DC with Resistive and Reactive loads.

3. Verification of Thevenin's and Norton's theorem.

4. Verification of KCL and KVL

5. Magnetization characteristics of D.C. Shunt generator.

6. Brake test on DC shunt motor. Determination of performance Characteristics.

7. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).

8. Brake test on 3-phase Induction motor (performance characteristics).

Any 5 experiments to be done from Section B

PART - B

1. PN Junction Diode Characteristics (Forward bias, Reverse bias)

2. Zener Diode Characteristics

3. Transistor CE Characteristics (Input and Output)

4. Rectifier without Filters (Full wave & half wave)

5. Rectifier with Filters (Full wave & half wave)
6. RC Phase Shift Oscillator

2014-15 **Code: 40310**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME I-Sem **L T/P/D C**
0 -/3/- 2

METALLURGY AND MECHANICS OF SOLIDS LAB

Pre-requisite: Engineering Mechanics

Objective: This course deals with composition of metals, mechanical properties depending upon their micro structure, heat treatment methods and their effect on micro structure of materials.

Codes/Tables: Nil

(A) Metallurgy Lab : Observation and usage of microstructures of various metals.

1. Preparation and study of the Micro Structure of pure metals like Iron, Cu and Al.
2. Preparation and study of the Microstructure of Mild steels, low carbon steels, high – C steels.
3. Study of the Micro Structures of Cast Irons.
4. Study of the Micro Structures of Non-Ferrous alloys.
5. Study of the Micro structures of Heat treated steels.
6. Hardeneability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

(B) Mechanics of Solids Lab :

1. Tension test
2. Bending test on

a) Simple supported beam b) Cantilever beam

3. Torsion test
4. Hardness test

a) Brinells hardness test b) Rockwell hardness test

5. Test on springs

a) compression spring b) Extension spring

6) Impact test

a)Izod b) Charpy

Outcome: Students can understand micro structures of different material, different heat treatment methods, change of mechanical properties based on micro structure of methods. Iron carbon equilibrium diagrams.

2014-15 **Code: 40311**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

PRODUCTION TECHNOLOGY

Pre-requisite: Basic Engineering Workshop

Objective: The objective of this subject is to provide various techniques used in manufacturing processes like foundry, welding, forging, press working etc which are commonly used in manufacturing industry.

Codes/Tables: Nil

UNIT - I

Casting: Steps involved in making a casting - Advantage of casting and its applications. Patterns and Pattern making - Types of patterns - Materials used for patterns, pattern allowances and their construction, Principles of Gating, Gating ratio and design of Gating systems.Solidification of casting - Concept - Solidification of pure metal and alloys, short & long freezing range alloys. Risers - Types, function and design, casting design considerations, special casting processes 1) Centrifugal 2)Die, 3) Investment.

Methods of Melting : Crucible melting, blast furnace and cupola operation, steel making processes.

UNIT - II

Welding: Classification of welding process types of welds and welded joints and their

characteristics, design of welded joints, Gas welding, ARC welding, Forge welding, resistance welding, Thermit welding.

Cutting of Metals: Oxy - Acetylene Gas cutting, Cutting of ferrous metals.

Inert Gas welding, TIG & MIG, welding, Friction welding, Induction welding, Explosive

welding, Laser welding, Soldering & Brazing. Heat affected zones in welding; welding defects - causes and remedies - destructive nondestructive testing of welds.

UNIT - III

Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth,

Comparison of properties of Cold and Hot worked parts, Rolling fundamentals - theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements.

Stamping, forming and other cold working processes : Blanking and piercing Bending and forming Drawing and its types wire drawing and Tube drawing coining Hot and cold spinning Types of presses and press tools. Forces and power requirement in the above operations.

UNIT-IV

Extrusion Of Metals: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion Impact extrusion Hydrostatic extrusion.

Forging processes: Principles of forging Tools and dies Types Forging Smith forging, Drop Forging Roll forging, Forging hammers, forging defects.

UNIT- V

Processing of Plastics: Types of Plastics, Properties, applications and their Processing Methods.

Moulding Equipment: Injection moulding, Types of Injection moulding, Blow moulding.

Outcome: Student shall be able to know the different Production processes like casting, welding, hot working, cold working, rolling, forging, extrusion and injection and blow moulding of plastics.

TEXT BOOKS:

1. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Edu.
2. Production Technology /Sarma P C /S.Chand Publication
3. Manufacturing Technology / P.N. Rao/TMH.

REFERENCE BOOKS:

1. Production Technology / R.K. Jain/ Khanna Publications

2. Process and materials of manufacturing Lindberg/PE

3. Principles of Metal Castings / Roenthal/Tata McGraw Hill Edition

4. Welding Process / Paramar /Allied Publishers

5. Production Engineering / Suresh Dalela & Ravi Shankar / Galgotia Publications Pvt. Ltd.

2014-15 **Code: 40312**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

KINEMATICS OF MACHINERY

Pre-requisite: Engineering Mechanics, Engineering Drawing, Mechanics of Solids

Objective: The objective of this subject is to provide basic concepts of links and their relative motion in different mechanisms.

Codes/Tables: Nil

UNIT - I

Mechanisms : Elements or Links , Classification, Rigid Link, flexible and fluid link, Types of kinematic pairs , sliding, turning, rolling, screw and spherical pairs lower and higher pairs, closed and open pairs, constrained motion, completely, partially or successfully constrained and incompletely constrained .

Machines : Mechanism and machines, classification of machines, kinematic chain , inversion of mechanism, inversion of mechanism , inversions of quadric cycle, chain , single and double slider crank chains.

UNIT - II

Straight Line Motion Mechanisms: Exact and approximate copiers and generated types Peaucellier, Hart and Scott Russul Grasshopper Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

Steering Mechanisms: Conditions for correct steering Davis Steering gear, Ackermans steering gear velocity ratio.

Hooke's Joint: Single and double Hookes joint Universial coupling application problems.

UNIT - III

Kinematics: Velocity and acceleration - Motion of link in machine - Determination of Velocity and acceleration diagrams - Graphical method - Application of relative velocity method four bar chain.

Analysis of Mechanisms: Analysis of slider crank chain for displacement , velocity and acceleration of slider - Acceleration diagram for a given mechanism, Kleins construction, Coriolis acceleration, determination of Coriolis component of acceleration.

Plane motion of body: Instantaneous center of rotation, centroids and axodes - relative motion between two bodies - Three centres in line theorem - Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT - IV

Cams: Definitions of cam and followers their uses Types of followers and cams Terminology Types of follower motion - Uniform velocity Simple harmonic motion and uniform acceleration. Maximumm velocity and maximum acceleration during outward and return strokes in the above 3 cases.

Analysis of motion of followers: Roller follower circular cam with straight, concave and convex flanks.

Belt Rope and Chain Drives: Introduction, Belt and rope drives, selection of belt drive- types of belt drives,V-belts, materials used for belt and rope drives, velocity ratio of belt drives, slip of belt, creep of belt, tensions for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, Chains- length, angular speed ratio, classification of chains.

UNIT - V

Gears:Higher pairs, friction wheels and toothed gears types law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloidal and involute profiles. Velocity of sliding phenomena of interferences

Methods of interference. Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact - Introduction to Helical, Bevel and worm gearing.

Gear Trains: Introduction - Train value - Types - Simple and reverted wheel train

Epicyclic gear Train. Methods of finding train value or velocity ratio - Epicyclic gear trains. Selection of gear box- Differential gear for an automobile.

Outcome: The student shall be able to understand the relative motions incurred in different mechanisms.

TEXT BOOKS:

1. Theory of Machines by Thomas Bevan/ CBS
2. Theory of machines/ PL. Balaney/khanna publishers.
3. Theory of Machines and Mechanisms/S.S.Rattan/Tata McGraw Hill Publishers

REFERENCES :

1. The theory of Machines /Shiegley/ Oxford.

2. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age International Publishers

3. Theory of Machines / R.K Bansal/Fire Wall media Publisher

2014-15 **Code: 40313**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

THERMAL ENGINEERING -I

Pre-requisite: Thermodynamics

Objective: The objective of this subject is to provide basic concepts of IC engines, compressors, Air-Conditioners and their performance.

Codes/Tables: Refrigeration tables, Psychrometric chart

UNIT – I

Actual Cycles and their Analysis: Introduction, Comparison of Air Standard and Actual Cycles. Time Loss Factor, Heat Loss Factor, Exhaust Blowdown-Loss due to Gas exchange process, Volumetric Efficiency. Loss due to Rubbing Friction, Actual and Fuel-Air Cycles Of CI Engines.

I.C. Engines : Classification - Working principles, Valve and Port Timing Diagrams, Air – Standard, air-fuel and actual cycles - Engine systems – Fuel, Carburetor, Fuel Injection System, Ignition, Cooling and Lubrication.

UNIT – II

Combustion in S.I. Engines : Normal Combustion and abnormal combustion – Importance of flame speed and effect of engine variables – Type of Abnormal combustion, pre-ignition and knocking (explanation of) – Fuel requirements and fuel rating, anti knock additives – combustion chamber – requirements, types.

Combustion in C.I. Engines : Four stages of combustion – Delay period and its importance – Effect of engine variables – Diesel Knock– Need for air movement, suction, compression and combustion induced turbulence – open and divided combustion chambers and nozzles used – fuel requirements and fuel rating.

UNIT – III

Testing and Performance : Parameters of performance - measurement of cylinder pressure, fuel consumption, air intake, exhaust gas composition, Brake power – Determination of frictional losses and indicated power – Performance test – Heat balance sheet and chart. Performance Test on multicylinder engine(Morse Test).

UNIT – IV

Compressors – Classification –positive displacement and roto dynamic machinery – Power producing and power absorbing machines, fan, blower and compressor – positive displacement and dynamic types – reciprocating and rotary types.

Reciprocating: Principle of operation, work required, Isothermal efficiency volumetric efficiency and effect of clearance, stage compression, undercooling, saving of work, minimum work condition for stage compression.

Rotary (Positive displacement type) : Roots Blower, vane sealed compressor, Lysholm compressor –mechanical details and principle of working – efficiency considerations.

UNIT-V

Dynamic Compressors: Centrifugal compressors: Mechanical details and principle of operation –velocity and pressure variation. Energy transfer-impeller blade shape-losses, slip factor, power input factor, pressure coefficient and adiabatic coefficient – velocity diagrams – power.

Axial Flow Compressors: Mechanical details and principle of operation – velocity triangles and energy transfer per stage degree of reaction, work done factor - isentropic efficiency- pressure rise calculations –Polytropic efficiency.

Outcome: The student shall be able to apply the knowledge in designing, testing and development of I.C. engines, Refrigerators and Air-Conditioners.

TEXT BOOKS:

1. I.C. Engines / V. GANESAN/ TMH Publishers

2. Turbines, Pumps, Compressors /SM Yahya / TMH Publishers

3. Thermal Engineering / Rajput / Lakshmi Publications.

REFERENCE BOOKS:

1. IC Engines/ Mathur & Sharm/ Dhanpath Rai & Sons.

2. Engineering fundamentals of IC Engines /Pulkrabek / Pearson /PHI

3. Thermal Engineering / Rudramoorthy / TMH Publishers

4. Thermodynamics & Heat Engines / B. Yadav/ Central Book Depot., Allahabad

5. I.C. Engines / Heywood /McGrawHill Publishers

6. Thermal Engineering /R.S. Khurmi & J.K.Gupta – S.Chand Publishers

7. IC Engines/ Ramalingam/ Scietech publishers

8. Thermal engineering data book/B.Srinivasulu Reddy/JK International Pub.

2014-2015 **Code: 40314**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

II Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

MECHANICS OF FLUIDS AND HYDRAULIC MACHINES

Pre-requisite: Engineering Mechanics

Objective: The objective of this subject is to provide the basic knowledge of fluids behavior at different conditions and their applications.

Codes/Tables: Nil

UNIT I

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

UNIT II

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

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

UNIT-III

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

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

UNIT IV

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

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

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

UNIT V

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

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

Outcome: The student shall be able to apply the knowledge to access the performance of hydraulic machines.

TEXT BOOKS:

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

REFERENCES :

1. Fluid Mechanics and Fluid Power Engineering / D.S. Kumar/Kotaria & Sons.

2. Fluid Mechanics and Machinery / D. Rama Durgaiah / New Age International.

3. Instrumentation for Engineering Measurements / James W. Dally, William E. Riley/John Wiley & Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements).

4. Fluid Mechanics and Hydraulic Machines / Rajput/ S.Chand Publications

2014-15 **Code: 40109**

MALLA REDDY ENGINEERING COLLEGE

(Autonomous)

II YEAR B.TECH. ME. II –SEM

L	T/P/D	C
4	-/-/-	4

ENVIRONMENTAL STUDIES

OBJECTIVES

- An interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences including geosystems, biology, chemistry, economics, political science and international processes.
- The ability to work effectively as a member of an interdisciplinary team on complex problems involving multiple competing stakeholders and agendas.
- The ability to apply quantitative reasoning skills to environmental problems including basic calculations related to energy, water, and air issues and the use of statistical methods in data analysis and argumentation.

UNIT-I

Ecosystems: 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, Biogeochemical cycles, Homeostasis / Cybernetics, Food chain concentration, Biomagnification, ecosystems value, services and carrying capacity.

UNIT-II

Natural Resources: 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, renewable and non renewable energy sources, use of alternate energy sources – case studies. Land resources: land as a resource, land degradation, man induced landslides and land use / land cover mapping.

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts, conservation of biodiversity: In-Situ and Ex-situ conservation. Food and fodder resources, Timber and non-timber forest products.

UNIT-III

Environmental Pollution And Control: 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, Waste water treatment methods: effluent treatment plants (ETP), Sewage treatment plants (STP), common and combined effluent treatment plants (CETP).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.

Noise Pollution: Sources, Industrial Noise- Occupational Health hazards, standards, Methods of control of Noise. Thermal Pollution: Thermal Comforts, Heat Island effect, Radiation effects.

Nuclear Pollution: Nuclear power plants, nuclear radiation, disasters and impacts, genetical disorders. Solid waste: types, Collection processing and disposal of industrial and municipal solid wastes composition and characteristics of e-Waste and its management.

UNIT-IV

Global Environmental Problems And Global Efforts : 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,

Environmental Impact Assessment (Eia) And Environmental Management Plan: Definition of Impact: classification of impacts, Positive and Negative, methods of baseline data acquisition. Impacts on different environmental components. Prediction of impacts and impact assessment methodologies. Environmental Impact Statement (EIS). Environmental Management Plan (EMP): Technological Solutions, preventive methods,

Control technologies, treatment technologies: green-belt- development, rain water harvesting, Remote sensing and GIS methods.

UNIT-V

Environmental Policy, Legislation, Rules And Regulations: National Environmental Policy, Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act- 1981, Water(Prevention and Control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .

Towards Sustainable Future: 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).

OUTCOMES

- To enable the students to realise the importance of the sustainable use of natural resources
- To make the students aware of the impacts of human actions on environment and measures to minimize and mitigate them
- To enable the students to become aware of the current issues and problems pertaining to the environment

TEXT BOOKS:

1. Environmental studies, From crisis to cure by R.Rajagopalan, 2005
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

REFERENCE BOOKS:

1. Text book of Environmental Science and Technology by M.Anji Reddy 2007
2. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi
3. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.

2014-15 **Code: 40M03**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

II YEAR B.TECH. ME. II –SEM **L T/P/D C**
4 -/-/- 4

MATHEMATICS – III
(Numerical Differentiation, Integration & Transform Techniques)

Objectives

1. Understands the applications of z-transforms
2. Find the Fourier series representation of the Periodic functions
3. Find the Fourier series representation for the functions in an arbitrary interval
4. Find the applications of numerical differentiation in evaluating engineering problems
5. For the given data the student can fit the respective curves.

UNIT – I

Fourier series & Transforms

Fourier Series: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.
Fourier Transforms: Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – II

Z-Transforms

Z-Transforms Inverse Z-Transform properties, damping rule, shifting rule, Initial and final value theorems, convolution theorem solution of difference equation by Z-Transforms

UNIT – III

Curve Fitting, Numerical Differentiation & Integration:

Curve fitting: Fitting a first degree (linear) and second degree (parabola), exponential, power curves for a data by the Method of least squares.
Numerical Differentiation & Integration: Trapezoidal Rule, Simpson's $1/3^{rd}$, 3/8 Rule, Gaussian Integration, Evaluation of principal value integrals, Generalized Quadrature.

UNIT – IV

Numerical solution of IVP's in ODE

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods –Predictor-Corrector Methods- Adams- Bashforth Method.

UNIT – V

Partial differential equations & Applications

Formation of partial differential equations by eliminating arbitrary constants or arbitrary functions, Solutions of first order linear (Lagrange) equation, Solution of nonlinear first order equations (four standard types), Solution using separation of variables, Application to heat equation (one dimension), wave equation (one dimension).

Outcomes

1. This best-fitting curve can be obtained by the method of least squares.
2. Applications of Fourier transforms in engineering problems.
3. PDEs can be used to describe a wide variety of phenomena such as sound, heat, electrostatics, electrodynamics, fluid flow, elasticity, or quantum mechanics.

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering by Kanti B.Datta ,Cengage Learning
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Numerical Methods using MATLAB by John H Matthews, Kurt D Fink, Pearson Education
4. Numerical Methods, Jain, SRK Iyyengar Narosa Publications

REFERENCE BOOKS:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
3. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
4. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
5. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
6. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
7. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
8. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

2014-15 **Code: 40315**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

II Year B.Tech. ME II-Sem

L	T/P/D	C
0	-/3/-	2

PRODUCTION TECHNOLOGY LAB

Pre-requisite: Production Technology

Objective: The objective of this subject is to provide information about different processes like casting, welding, forming etc.

Codes/Tables: Nil

Minimum of 12 Experiments need to be performed

I. METAL CASTING LAB:

1. Pattern Design and making - for one casting drawing.

2. Sand properties testing - Exercise -for strengths, and permeability - 1

3. Moulding Melting and Casting - 1 Exercise

II WELDING LAB:

1. ARC Welding Lap & Butt Joint - 2 Exercises

2. Spot Welding - 1 Exercise

3. TIG Welding - 1 Exercise

4. Plasma welding and Brazing - 2 Exercises (Water Plasma Device)

III MECHANICAL PRESS WORKING:

1. Blanking & Piercing operation and study of simple, compound and progressive press tool.

2. Hydraulic Press: Deep drawing and extrusion operation.

3. Bending and other operations

IV PROCESSING OF PLASTICS:

1. Injection Moulding

2. Blow Moulding

Outcome: The students shall be able to know how to produce components with different production processes.

2014-15 **Code: 40316**

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

II Year B.Tech. ME II-Sem

L	T/P/D	C
0	-/3/-	2

MECHANICS OF FLUIDS AND HYDRAULIC MACHINES LAB

Pre-requisite: Mechanics of Fluids and Hydraulic Machines

Objective: The objective of this subject is to provide

Codes/Tables: Nil

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Verification of Bernoulli's Theorems.

Note: Any 10 of the above 12 experiments are to be conducted.

Outcome: The students shall be able to know how to determine the Cd of Venturi & orifice meter and Performance of Hydraulic machines.

2014-15 **Code: 30B01**

MALLA REDDY ENGINEERING COLLEGE

(Autonomous)

III Year B.Tech. ME. I –SEM **L T/P/D C**

4 -/-/- 4

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objective: MEFA 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

UNIT I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT II

Theory of Production and Cost Analysis: 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.

UNIT III

Introduction to Markets & Pricing Policies: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Objectives and Policies of Pricing - **Methods of Pricing:** Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

UNIT IV

Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

Capital And Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

UNIT V

Introduction To Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Financial Analysis Through Ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

Course Outcome:

Students understand how market forces affect price and quantity. They can also learn how to measure risk and uncertainty, and then incorporate these measures into their business decision making and by the end of the course the students will be able to:

- think in the terms of a managerial economist
- appraise economic articles in newspapers such as Economic Times
- solve quantitative problems in a business environment
- acquire an ability to apply knowledge of economic concepts, Accounting concepts.
- ability to identify, formulate, and solve financial problems
- a knowledge of Financial Concepts as applied to Business Management

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCE BOOKS:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4 Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
8. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley.
11. Dwivedi:Managerial Economics, 6th Ed., Vikas.

2014-15 **Code: 40317**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME I-Sem

L	T/P/D	C
3	1/-/-	3

ENGINEERING METROLOGY

Pre-requisite: Physics

Objective: The objective of this subject is to provide basic concepts of measuring devices in manufacturing process.

Codes/Tables: Nil

UNIT – I

Systems of Limits and Fits: Introduction, normal size, tolerance limits, deviations, allowance, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly. Indian standard Institution system – British standard system, International Standard system for plain ad screwed work.

Limit Gauges: Taylor's principle – Design of go and No go gauges, plug ring, snap, gap, taper, profile and position gauges.

UNIT – II

Linear Measurement: Length standard, line and end standard, slip gauges – calibration of the slip gauges, Dial indicator, micrometers.

Measurement Of Angles And Tapers: Different methods – Bevel protractor – angle slip gauges – spirit levels – sine bar – Sine plate, rollers and spheres used to determine the tapers.

Flat Surface Measurement: Measurement of flat surfaces – instruments used – straight edges – surface plates – optical flats and their uses

Optical Measuring Instruments: Tool maker's microscope and its uses – collimators, optical projector, auto collimator and interferometer.

UNIT – III

Surface Roughness Measurement : Differences between surface roughness and surface waviness-Numerical assessment of surface finish – CLA,R, R.M.S Values – Rz values, Rz value, Methods of measurement of surface finish-profilograph. Talysurf, ISI symbols for indication of surface finish.

UNIT-IV

Measurement Through Comparators: Comparators – Mechanical, Electrical and Electronic Comparators, pneumatic comparators and their uses in mass production.

Screw Thread Measurement: Element of measurement – errors in screw threads – measurement of effective diameter, angle of thread and thread pitch, profile thread gauges.

UNIT- V

Gear Measurement: Gear measuring instruments, Gear tooth profile measurement, Measurement of diameter, pitch pressure angle and tooth thickness.

Machine tool Alignment Tests: Requirements of Machine Tool Alignment Tests, Alignment tests on lathe, milling, drilling machine tools, Preparation of acceptance charts.

Coordinate Measuring Machines: Types of CMM, Role of CMM, and Application of CMM.

Outcome: The students shall be able to know how to make use of measuring devices effectively.

TEXT BOOKS:

1. Engineering Metrology / I C Gupta./ Danpath Rai Publications
2. Engineering Metrology / R.K. Jain / Khanna Publishers

REFERENCE BOOKS:

1. BIS standards on Limits & Fits, Surface Finish, Machine Tool Alignment etc.
2. Fundamentals of Dimensional Metrology 4e / Connie Dotson / Thomson
3. Handbook of Tribology: Materials, Coating, and Surface Treatments/ Bharat Bhushan and B.K.Gupta/McGrawHill
4. Surface Engineering with Lasers/ Dehosson J.T./Springer Publishers
5. Surface Engineering for corrosion and wear resistance / JR Davis/ Woodhead Publishers.

2014-15 **Code: 40318**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME I-Sem **L T/P/D C**
4 1/-/- 4

DYNAMICS OF MACHINERY

Pre-requisite: Engineering Mechanics and Kinematics of Machinery

Objective: The objective of this subject is to provide basic concepts of links and their relative motion and forces in different mechanisms.

Codes/Tables: Nil

UNIT – I
Precession: Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships.

UNIT – II
Static And Dynamic Force Analysis Of Planar Mechanisms: Intoduction -Free Body Diagrams – Conditions for equilibrium – Two, Three and Four Members – Inertia forces and D'Alembert's Principle – planar rotation about a fixed centre.
Synthesis Of Linkages: Three position synthesis – Four position Synthesis – Precision positions – Structural error – Chebychev's spacing, Freudentein's equation, Problems

UNIT –III
Clutches: Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch.
Brakes and Dynamometers: Simple block brakes, internal expanding brake, band brake of vehicle. Dynamometers – absorption and transmission types. General description and methods of operations.
Turning Moment Diagram and Fly Wheels: Turning moment – Inertia Torque connecting rod angular velocity and acceleration, crank effort and torque diagrams – Fluctuation of energy – Fly wheels and their design.

UNIT – IV
Balancing: Balancing of rotating masses Single and multiple – single and different planes.
Balancing of Reciprocating Masses- Primary, Secondary, and higher balancing of reciprocating masses. Analytical and graphical methods. Unbalanced forces and couples – examination of "V", multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing.
Vibration: Free Vibration of mass attached to vertical spring – Simple problems on forced damped vibration, Vibration Isolation & Transmissibility Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

UNIT – V
Governers : Watt, Porter and Proell governors. Spring loaded governors – Hartnell and hartung with auxili ary springs. Sensitiveness, isochronism and hunting.

Outcome: The student will learn about the kinematics and dynamic analysis of machine elements including linkages, cams, and gears, within the general machine design context.

TEXT BOOKS:
1. Theory of Machines / Thomas Bevan / CBS Publishers
2. Theory of Machines / Jagadish Lal & J.M.Shah / Metropolitan.

REFERENCE BOOKS:
1. Theory of Machines / Shiegly / MGH Publishers
2. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age International Publishers
3. Theory of Machines / S.S Ratan/ Mc. Graw Hill Publishers
4. Theory of machines / Khurmi/S.Chand Publications

2014-15 **Code: 40319**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME I-Sem

L	T/P/D	C
4	1/-/-	4

MACHINE TOOLS

Pre-requisite: Kinematics of Machinery, Production Technology

Objective: The objective of this subject is to provide basic knowledge of different machine tools and their operations.

Codes/Tables: Nil

UNIT – I

Elementary Treatment of Metal Cutting Theory – Element of cutting process – Geometry of single point tool and angles chip formation and types of chips – built up edge and its effects chip breakers. Mechanics of orthogonal cutting – Merchant's Force diagram, cutting forces – cutting speeds, feed, depth of cut, tool life, coolants, machinability – Tool materials. Cutting tool temperature measuring methods.

UNIT – II

Lathe Machines – Principle of working, specification of lathe – types of lathe – work holders tool holders – Box tools Taper turning thread turning – for Lathes and attachments. Turret and capstan lathes – collet chucks – other work holders – tool holding devices – box and tool layout. Principal features of automatic lathes – classification – Single spindle and multi-spindle automatic lathes – Cam design and applications.

UNIT – III

Shaping, Slotting and Planing Machines – Principles of working – Principal parts – specification classification, operations performed. Machining time calculations.

Drilling and Boring Machines – Principles of working, specifications, types, operations performed – tool holding devices – twist drill – Boring machines – Fine boring machines – Jig Boring machine. Deep hole drilling machine.

UNIT – IV

Milling machine – Principles of working – specifications – classifications of milling machines – Principal features of horizontal, vertical and universal milling machines – machining operations Types geometry of milling cutters – milling cutters – methods of indexing – Accessories to milling machines, kinematic scheme of milling cutters – milling cutters – methods of indexing.

Grinding machine – Fundamentals – Theory of grinding – classification of grinding machine – cylindrical and surface grinding machine – Tool and cutter grinding machine – special types of grinding machines – Different types of abrasives – bonds specification of a grinding wheel and selection of a grinding wheel.

UNIT - V

Lapping, honing and broaching machines – comparison to grinding – lapping and honing. Kinematics scheme of Lapping, Honing and Broaching machines. Constructional features of speed and feed Units, machining time calculations

Principles of design of Jigs and fixtures and uses. Classification of Jigs & Fixtures – Principles of location and clamping – Types of clamping & work holding devices. Typical examples of jigs and fixtures.

Outcome: Students will become familiar with different cutting tools, different operations performed on different machine tools.

TEXT BOOKS:

1. Production Technology / H.M.T. (Hindustan Machine Tools).
2. Production Technology / R.K. Jain and S.C. Gupta / Khanna Publications
3. Manufacturing Technology / P N RAO Vol II / Tata Mc Graw Hill Education

REFERENCE BOOKS:

1. Machine Tools / C.Elanchezhian and M. Vijayan / Anuradha Agencies Publishers.
2. Workshop Technology / B.S.Raghu Vamshi – Vol II / Anuradha Agencies Publishers.
3. Production Technology (Machine Tools) / PC Sharma / S.Chand Publishers

2014-15 **Code: 40320**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME I-Sem

L	T/P/D	C
4	1 /- /-	4

DESIGN OF MACHINE MEMBERS – I

Pre-requisite: Engineering Mechanics, Mechanics of solids and Kinematics of Machinery
Objective: The objective of this subject is to provide design procedure for designing different machine members.
Codes/Tables: Design Data Hand Book by S MD Jalaluddin

UNIT – I
Introduction: General considerations in the design of Engineering Materials and their properties – selection – Manufacturing consideration in design. Tolerances and fits –BIS codes of steels.
Stresses In Machine Members: Simple stresses –Introduction to Torsion- Complex stresses – impact stresses – stress strain relation – Various theories of failure – factor of safety – Design for strength and rigidity – preferred numbers. The concept of stiffness in tension, bending, torsion and combined situations.

UNIT – II
Fatigue Loading: Stress concentration – Theoretical stress Concentration factor – Fatigue stress concentration factor notch sensitivity – Design for fluctuating stresses – Endurance limit – Estimation of Endurance strength – Fatigue theories of failure - Goodman and Soderberg.

UNIT – III
Riveted, Welded & Bolted Joints:
Riveted Joints: Modes of failure of riveted joints – Strength equations – efficiency of riveted joints – Design of Boiler joints - eccentrically loaded riveted joints.
Welded Joints: Design of Fillet welds – axial loads – Circular fillet welds – bending and torsion - eccentrically loaded joints.
Bolted Joints: – Design of bolts with pre-stresses – Design of joints under eccentric loading –bolt of uniform strength, Cylinder cover joints

UNIT – IV
Design of Shafts: Design of solid and hollow shafts for strength and rigidity – Design of shafts for combined bending and axial loads – Shaft sizes – BIS code – Design of shaft for a gear and belt drives.
Shaft Coupling: Rigid couplings – Muff, Split muff and Flange couplings. Flexible couplings – Pin - Bush coupling.
Axially Loaded Joints: Keys, Cotters and Knuckle Joints: Design of Keys-stresses in keys-cottered joints-spigot and socket, sleeve and cotter, jib and cotter joints- Knuckle joints.

UNIT – V
Mechanical Springs : Stresses and deflections of helical springs – Extension -compression springs – Springs for static and fatigue loading – natural frequency of helical springs – Energy storage capacity – helical torsion springs – Co-axial springs.

Outcome: By the end of the course, each student should be able to know a particular sub-set of machine elements and a given problem, Define failure, Decide on an appropriate failure model, and Design an appropriate machine element using allowable load (under the given operating conditions), Required element life, Manufacturing considerations, and Manage engineering projects.

TEXT BOOKS:
1. Mechanical Engineering Design / Shigley McGrawhill
2. Machine design / Pandya & shah/ Charotar Publishers

REFERENCE BOOKS:
1. Design of Machine Elements / V.M. Faires/ C.B.S. Publishers & Distributors
2. Machine design / Schaum Series.
3. Machine Design / S MD Jalaludin/ Anuradha Publishers
4. Data Books: (I) P.S.G. College of Technology (ii) Mahadevan

2014-15 **Code: 40321**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME I-Sem

T	T/P/D	C
4	1/-/-	4

THERMAL ENGINEERING –II

Pre-requisite: Thermodynamics, Thermal Engineering - I

Objective: The objective of this subject is to provide knowledge about steam power plant, Steam Nozzles, Steam Turbines, Steam condensers, Gas turbines, Jet propulsion

Codes/Tables: Steam Tables

UNIT – I

Basic Concepts: Rankine cycle - Schematic layout, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance – Regeneration & reheating. **Combustion**: fuels and combustion, concepts of heat of reaction, adiabatic flame temperature, stoichiometry, flue gas analysis

UNIT II

Boilers : Classification – Working principles – with sketches including H.P.Boilers – Mountings and Accessories – Working principles, Boiler horse power, equivalent evaporation, efficiency and heat balance – Draught, classification – Height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney – artificial draught, induced and forced draft.

UNIT – III

Steam Condensers : Requirements of steam condensing plant – Classification of condensers – working principle of different types of condensers vacuum efficiency and condenser efficiency – air leakage, sources and its affects, air pump- cooling water requirement

Steam Nozzles : Function of nozzle – applications - types, Flow through nozzles, thermodynamic analysis – assumptions -velocity of nozzle at exit-Ideal and actual expansion in nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape: Super saturated flow, its effects, degree of super saturation and degree of under cooling - Wilson line.

UNIT – IV

Steam Turbines: Classification – Impulse turbine; Mechanical details – Velocity diagram – effect of friction – power developed, axial thrust, blade or diagram efficiency – condition for maximum efficiency. De-Laval Turbine - its features. Methods to reduce rotor speed-Velocity compounding and pressure compounding, Velocity and Pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine.

Reaction Turbine: Mechanical details – principle of operation, thermodynamic analysis of a stage, degree of reaction – velocity diagram – Parson's reaction turbine – condition for maximum efficiency.

UNIT – V

Gas Turbines : Simple gas turbine plant – Ideal cycle, essential components – parameters of performance – actual cycle – regeneration, inter cooling and reheating –Closed and Semi-closed cycles – merits and demerits, Brief concepts about compressors, combustion chambers and turbines of Gas Turbine Plant.

Jet Propulsion : Principle of Operation –Classification of jet propulsive engines – Working Principles with schematic diagrams and representation on T-S diagram - Thrust, Thrust Power and Propulsion Efficiency – Turbo jet engines – Needs and Demands met by Turbo jet – Schematic Diagram, Thermodynamic Cycle, Performance Evaluation Thrust Augmentation – Methods.

Rockets: Application – Working Principle – Classification – Propellant Type – Thrust, Propulsive Efficiency – Specific Impulse – Solid and Liquid propellant Rocket Engines.

Outcome: The basic definitions of thermodynamics and a pure substance, the laws of Thermodynamics for closed and for open systems; the analysis of such systems, the definition of enthalpy and entropy; the steam power cycles. Have the ability to:- extract a problem definition and identify the appropriate laws of thermodynamics to solve this problem.

TEXT BOOKS:

1. Gas Turbines / V.Ganesan /TMH Publishers

2. Thermal Engineering / R.K. Rajput / Lakshmi Publications

REFERENCE BOOKS:

1. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot

2. Gas Turbines and Propulsive Systems / P.Khajuria & S.P.Dubey – /Dhanpatrai Publications

3. Gas Turbines / Cohen, Rogers and Saravana Muttoo / Addison Wesley – Longman

4. Thermal Engineering / R.S Khurmi/JS Gupta/S.Chand Publishers

5. Thermal Engineering / P.L.Bellaney/ khanna publishers.

6. Thermal Engineering / M.L.Marthur & Mehta/Jain bros Publishers

2014-15 **Code: 40322**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME I-Sem

L	T/P/D	C
0	-/3/-	2

MACHINE TOOLS & METROLOGY LAB

Pre-requisite: Machine Tools and Metrology

Objective: The objective of this subject is to provide knowledge about different machnines and machining operations, different measuring instruments.

Codes/Tables: Nil

Section A:

1. Measurement of lengths, heights, diameters by vernier calipers micrometers etc.
2. Measurement of bores by internal micrometers and dial bore indicators.
3. Use of gear teeth, vernier calipers and checking the chordal addendum and chordal height of spur gear.
4. Machine tool - alignment test on the lathe.
5. Machine tool alignment test on milling machine.
6. Tool makers microscope and its application
7. Angle and taper measurements by Bevel protractor, Sine bars, etc.,
8. Use of spirit level in finding the flatness of surface plate.
9. Thread measurement by two wire / three wire method or Tool makers microscope.
10. Surface roughness measurement by Taly Surf.
11. Surface Wear Resistances Test using Electro Spark Coating Device.

Section B:

1. Introduction of general purpose machines - Lathe, Drilling machine, Milling machine, Shaper, Planing machine, slotting machine, Cylindrical Grinder, surface grinder and tool and cutter grinder.
2. Step turning and taper turning on lathe machine
3. Thread cutting and knurling on - lathe machine.
4. Drilling and Tapping
5. Shaping and Planing
6. Slotting
7. Milling
8. Cylindrical Surface Grinding
9. Grinding of Tool angles.

Outcome: The students shall be able to know operations to be performed on various conventional machines, cutting tools and measuring instruments.

2014-15 **Code: 40E04**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME I-Sem

L	T/P/D	C
0	-/3/-	2

ADVANCED ENGLISH COMMUNICATION SKILLS LABORATORY
(Common for CE, ME, Mining, EEE, ECE, CSE, IT)

Introduction:

Effective Communication binds any progressive organization. At the B Tech third year level, the Advanced English Communication 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 language skills. The course also 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.

Objectives:

- To help the students understand the requisites to successfully deliver as professionals and the challenges they need to encounter
- To help them make a smooth transition from the academic world to the professional world
- To refine the style of individual communication
- To broaden and raise awareness about the dynamics of communication in the work environment
- To integrate the learning experience with the functional areas of communication
- Helping the students to become industry ready

Methodology:

Facilitator's role: Since classroom learning augments thinking process, helping them to develop written, spoken and non verbal communication, the facilitator / Faculty would briefly discuss the topics with the students and later on guide them while the students involve in activities, writing work and while making presentations. The facilitator is required to design a lot of practical/industry oriented project works for the students

*Students are required to participate, perform, write and submit the work in the form of written documents or Power Point Presentations to hone their spoken written and non verbal communication skills. Students are to take up field work and submit the project work.

UNIT I

Industry awareness- Introduction to the world of work- Collection of information about various sectors, companies, enterprises, organizations and conglomerates; field visit to the industry they wish to work for

Instruction: Here the students are required to work in teams- Team players-participating and responding, team leader - delegates, plans and involves all the team members, Challenges the team faces -the report presented in the written form and making presentation

UNIT II

Job hunt process

- SWOT analysis, correspondence and browsing the internet , 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.

UNIT 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.

UNIT IV

Interview skills- 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.

UNIT V

Office etiquette- Formal Conversation, elevator etiquette, table manners, office attire- do's and don'ts, gossips and rumors, greetings and meetings, speaking to seniors and handshakes , offering and taking visiting cards.

UNIT VI

E- Correspondence and Email etiquette

Common web mail services, yahoo, gmail etc, fields to pay attention- To:, Cc:, Bcc:, Reply All, Subject, Salutation, Body, Signature, Font, Caps Lock , Highlight, The 'KISS' strategy(Keep It Simple and Short,)Points to remember while signing off, Introduction to Technical Vocabulary

- This unit is purely for internal assessment/evaluation

UNIT VII

Report writing- types of report, project report writing, technical reports, importance of pictorial presentation- graphs, diagrams etc

Instruction: The students are required to work on a project. Field work and collection of information, prepare a project report, present the project in the form of Power Point Presentation and written document. This report will be given weightage during the external examination

OUTCOME

Since the communication skills cannot be taught but be developed through practice the student will be competent communicator through application and the use of the concepts and activities in different units.

Reference Books

- Handbook of practical Communication Skills by Chrissie Wright
- How to win friends and influence people by Dale |Carnegie
- Skills with people by Les Giblin
- Bringing out the best in people by Aubrey Daniels
- The definitive book on body Language by Barbara and Allan Pease
- Just Listen :Discover the Secret to getting through to absolutely anything by Mark Goulstone
- Ten Much by A G Krishna Murthy
- Communication skills for Professionals by Cambridge Publishers
- Good practice Student's book on Communication skills by Cambridge Publishers
- Word Power Made Easy by Norman Lewis
- Effective Technical Communication by Ashraf Rizbi
- Resume Magic: Trade Secrets of a Professional Resume by Susan Britton Whitcomb

2014-15 **Code: 40323**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
4	-/-/-	4

AUTOMOBILE ENGINEERING

Pre-requisite: Thermal Engineering

Objective: The objective of this subject is to provide knowledge about various systems involved in automobile engine.

Codes/Tables: Nil

UNIT – I

Introduction : Components of four wheeler automobile – chassis and body – power unit –power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft..

Fuel System: S.I. Engine: Fuel supply systems, Mechanical and electrical fuel pump – filters – carburettor – types – air filters – petrol injection.

C.I. Engines: Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps.

UNIT – II

Cooling System : Cooling Requirements, Air Cooling, Liquid Cooling, Thermo, water and Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporating cooling – pressure sealed cooling – antifreeze solutions.

Ignition System: Function of an ignition system, battery ignition system, constructional features of storage, battery, auto transformer, contact breaker points, condenser and spark plug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

Unit – III

Emission from Automobiles: – Pollution standards National and international – Pollution Control – Techniques – Multipoint fuel injection for SI Engines. Common rail diesel injection Energy alternatives – Solar, Photo-voltaic, hydrogen, Biomass, alcohols, LPG,CNG, liquid Fuels and gaseous fuels, electrical-their merits and demerits.

Electrical System : Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

UNIT – IV

Transmission System : Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box , over drive torque converter. Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.

UNIT – V

Suspension System: Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

Braking System: Mechanical brake system, Hydraulic brake system, Master cylinder, wheel cylinder tandem master cylinder Requirement of brake fluid, Pneumatic and vacuum brakes.

Steering System: Steering geometry – camber, castor, king pin rake, combined angle toe - in, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

Outcome: The Automotive Engineering program aims to provide practice-oriented education based on the latest scientific results and methods, which enable students to work independently as automotive engineers and enables to face increasing challenges and standards of global markets.

TEXT BOOKS:

1. Automobile Engineering / William Crouse/TMH Education
2. Automobile Engineering / Gupta, Vol – 2/Standard Publications

REFERENCE BOOKS:

1. Automotive Engineering / Newton Steeds & Garrett

2. Automotive Mechanics / G.B.S. Narang/Khanna Publishers

3. Automotive Mechanics / Heitner/ D. Van Nostrand company

4. Automotive Engines / Srinivasan/ Tata McGraw-Hill Education

5. Automobile Engineering /K.K. Ramalingam / Scitech Publications (India) PVT. LTD.

6. Automotive Mechanics / Vol. 1 & Vol. 2 / Kripal Sing/Standard Publishers

2014-15 **Code: 40324**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

FINITE ELEMENT METHODS

Pre-requisite: Engineering Mechanics, Mechanics of solids and Design of Machine Members

Objective: The objective of this subject is to provide knowledge about to do build FEM models of physical problems.

Codes/Tables: Nil

UNIT I

Introduction to FEM: basic concepts, historical back ground, application of FEM, general description, comparison of FEM With other methods. Basic Equation of elasticity. Stress-strain and strain-Displacement relations. Raleigh-Ritz method, weighted residual methods.

UNIT II

One Dimensional Problems: Stiffness equation for a axial bar element in local co-ordinates using Potential energies approach and Virtual energy principle-Finite Elements analysis of uniforms, stepped and tapered bars subjected to mechanical and thermal loads-assembly of Global Stiffness matrix and load vector-quadric shape functions –properties of stiffness matrix.

Stiffness equation for a truss bar element oriented in 2D plane-Finite Element analysis of trusses-plane truss and Space truss elements-methods of assembly

UNIT III

Analysis of Beams: Hermite shape functions – Element stiffness matrix-Load vector –problems.

UNIT IV

2-D Problems: CST – stiffness matrix and load vector –Isoperimetric element representation –shape function – convergence requirements-problems.

Two dimensional four nodded Isoperimetric elements – Numerical integration- Finite Element Modeling of Ax symmetric solids subjected to Axisymmetric loading with triangular elements- 3D Problems-Tetrahedran elements

UNIT-V

Scalar field problems : 1D Heat conduction- 1 D Fin Elements – 2D Heat Conduction- Analysis of thin plates-Composite slabs- Problems.

Dynamic Analysis: Dynamic equations-Lumped and Consistent Mass Matrices- Eigen Values and Eigen Vectors-Mode shapes- Model Analysis for Bars and Beams

Outcome: Upon completion of the course work, the students will Develop comprehensive knowledge in the fundamental mathematical and physical basis of FEM, how to do build FEM models of physical problems and apply appropriate constraints and boundary conditions along with external loads and exercise critical thinking in interpreting results from FEM analysis. This will include the ability to identify bad results by looking at deflected shapes, stress contours, eigen frequency animations as well as field distributions.

TEXT BOOKS:

1. The Finite Element Methods in Engineering / S.S.Rao-Elsevier-4th Edition
2. Introduction to finite elements in engineering / Tirupati.K Chandrupatla and Ashok. D. Belagunda/ Pearson Prentice Hall

REFERENCE BOOKS:

1. Finite Element Methods/Alavala/TMH Publishers
2. An Introduction to finite element methods / J.N.Reddy / McGrawhill Publishers
3. The Finite element method in engineering science / O.C.Zienkowitz,/ McGrawhill Publishers
4. Concepts and Applications of finite element analysis / Robert Cook /Wiley Publishers
5. Introduction to Finite Element Analysis / S.Md.Jalaludeen/ Anuradha publications

2014-15 **Code: 40325**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

REFRIGERATION AND AIR CONDITIONING

Pre-requisite: Thermodynamics and Thermal Engineering

Objective: The objective of this subject is to provide knowledge about different cycles related to refrigeration and air conditioning.

Codes/Tables: Refrigeration Tables and psychrometric charts

UNIT – I

Introduction to Refrigeration : Necessity and applications – Unit of refrigeration and C.O.P. –Mechanical Refrigeration – Types of Ideal cycles of refrigeration.

Air Refrigeration: Bell Coleman cycle and Brayton Cycle, Open and Dense air systems – Actual air refrigeration system problems – Refrigeration needs of Air crafts.

Principles of Evaporators: classification – Working Principles, Expansion devices – Types – Working Principles

Refrigerants – Desirable properties – classification refrigerants used – Nomenclature – Ozone Depletion– Global Warming .

UNIT – II

Vapour compression refrigeration: working principle and essential components of the plant – simple Vapour compression refrigeration cycle – COP – Representation of cycle on T-S and p-h charts – effect of sub cooling and super heating – cycle analysis – Actual cycle Influence of various parameters on system performance – Use of p-h charts – numerical Problems.

UNIT III

Vapor Absorption System – Calculation of max COP – description and working of NH3 – water system and Li Br – water (Two shell & Four shell) System. Principle of operation Three Fluid absorption system, salient features.

Steam Jet Refrigeration System – Working Principle and Basic Components. Principle and operation of (i) Thermoelectric refrigerator (ii) Vortex tube or Hilsch tube

UNIT – IV

Introduction to Air Conditioning: Psychometric Properties & Processes – Characterization of Sensible and latent heat loads — Need for Ventilation, Consideration of Infiltration – Load concepts of RSHF, GSHF- Problems, Concept of ESHF and ADP.

UNIT V

Requirements of human comfort and concept of effective temperature- Comfort chart –Comfort Air conditioning – Requirements of Industrial air conditioning , Air conditioning Load Calculations.

Air Conditioning systems - Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, fans and blowers. Heat Pump – Heat sources – different heat pump circuits.

Outcome: It will give learners a basic - but solid - understanding of the fundamentals of refrigeration, the main system types and components, the range of applications, including air conditioning and heat pumps, the use of controls, and the key provisions and impact of recent legislation on the sector.

TEXT BOOKS:

1. Refrigeration and Air Conditioning / CP Arora / TMH Publishers
2. A Course in Refrigeration and Air conditioning / SC Arora & Domkundwar / Dhanpatrai Publications

REFERENCE BOOKS:

1. Air Conditioning / Lang / CBS publishers
2. Principles of Refrigeration / Dossat / Pearson Education.
3. Refrigeration and Air Conditioning/ P.L.Bellaney/Khanna Publishers
4. Basic Refrigeration and Air-Conditioning / Ananthanarayanan / TMH Publishers
5. Refrigeration and Air Conditioning / R.S. Khurmi & J.K Gupta / S.Chand – Eurasia Publishing House (P) Ltd.
6. Refrigeration and Air Conditioning / Manohar Prasad / New Age International Publ.

2014-15 **Code: 40326**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

DESIGN OF MACHINE MEMBERS – II

Pre-requisite: Design of Machine Members-I

Objective: The objective of this subject is to provide knowledge about designing of bearings and power transmitting elements like pullies and gears.

Codes/Tables: Design data book.

UNIT – I

Sliding Contact Bearings: Types of Journal bearings – Basic modes of Lubrication – Bearing construction –bearing design –bearing materials – Selection of Lubricants

Rolling Contact Bearings: Types of Rolling Contact bearings – Selection of bearing type – Selection of Bearing life – Design for cyclic loads and speeds – Static and Dynamic loading of ball & roller bearings.

UNIT –II

Design of IC Engine Parts: Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – Cranks and Crank shafts, strength and proportions of over hung and center cranks – Crank pins, Crank shafts. Pistons, Forces acting on piston – Construction Design and proportions of piston. Cylinder, Cylinder liners,

UNIT – III

Power Transmissions Systems, Pulleys: Transmission of power by Belt and Rope drives , Transmission efficiencies, Belts – Flat and V types – Ropes - pulleys for belt and rope drives, Materials, Chain drives

UNIT – IV

Spur Gear Drives: Spur gears- Load concentration factor – Dynamic load factor. Surface compressive strength – Bending strength – Design analysis of spur gears – Estimation of centre distance, module and face width, check for plastic deformation. Check for dynamic and wear considerations.

Helical and Bevel Gear Drives: Helical and Bevel gears – Load concentration factor – Dynamic load factor. Surface compressive strength – Bending strength – Design analysis of Helical and Bevel gears – Estimation of centre distance, module and face width, check for plastic deformation. Check for dynamic and wear considerations.

UNIT – V

Design of Worm Gears: Worm gears – Properties of Worm gears – Selection of materials – Strength and wear rating of worm gears – Force analysis – Friction in worm gears – thermal considerations.

Design of Power Screws: Design of screw, Square ACME, Buttress screws, design of nut, compound screw, differential screw, ball screw- possible failures.

Outcome: By the end of the course, students should be able to Apply best practice manufacturing and assembly guidelines to their designs, Understand the capabilities and limitations of the main production processing groups in relation with the design, apply process selection, component costing, manufacturing planning and design strategies to their projects.

TEXT BOOK:

1. Mech. Engg. Design / JE Shigley/ Tata McGraw-Hill Education

2. Machine Design/V.Bhandari / TMH Publishers

REFERENCE BOOKS:

1. Machine Design / R.N. Norton/ Penton IPC

2. Machine Design / Kannaiah/ Scietech Publishers

3. Machine Design / S MD Jalaludin, Anuradha Publishers

4. Thermal Engineering / R.S. Khurmi & J.S.Gupta / S.Chand Pub.

5. Data Books: (I) P.S.G. College of Technology (ii) Mahadevan

2014-15 **Code: 40327**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

HEAT TRANSFER

Pre-requisite: Thermodynamics

Objective: The objective of this subject is to provide knowledge about Heat transfer through conduction, convection and radiation.

Codes/Tables: Heat and Mass Transfer data book

UNIT – I

Introduction: Modes and mechanisms of heat transfer – Basic laws of heat transfer –General discussion about applications of heat transfer.

Conduction Heat Transfer: Fourier rate equation – General heat conduction equation in Cartesian, Cylindrical and Spherical coordinates.

Simplification and forms of the field equation – steady, unsteady and periodic heat transfer – Initial and boundary conditions.

One Dimensional Steady State Conduction Heat Transfer: Homogeneous slabs, hollow cylinders and spheres – overall heat transfer coefficient – electrical analogy – Critical radius of insulation

UNIT-II

One Dimensional Steady State Conduction Heat Transfer: Variable Thermal conductivity – systems with heat sources or Heat generation. Extended surface (fins) Heat Transfer – Long Fin, Fin with insulated tip and Short Fin, Application to error measurement of Temperature.

One Dimensional Transient Conduction Heat Transfer: Systems with negligible internal resistance – Significance of Biot and Fourier Numbers - Chart solutions of transient conduction systems.

UNIT – III

Convective Heat Transfer : Classification of systems based on causation of flow, condition of flow, configuration of flow and medium of flow – Dimensional analysis as a tool for experimental investigation –Buckingham Pi Theorem and method, application for developing semi – empirical non- dimensional correlation for convection heat transfer – Significance of non-dimensional numbers – Concepts of Continuity, Momentum and Energy Equations.

Forced convection: External Flows: Concepts about hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer -Flat plates and Cylinders.

Internal Flows: Concepts about Hydrodynamic and Thermal Entry Lengths – Division of internal flow based on this –Use of empirical relations for Horizontal Pipe Flow and annulus flow.

UNIT IV

Free Convection: Development of Hydrodynamic and thermal boundary layer along a vertical plate – Use of empirical relations for Vertical plates and pipes.

Heat Transfer with Phase Change: Boiling: – Pool boiling – Regimes Calculations on Nucleate boiling, Critical Heat flux and Film boiling.

Condensation: Film wise and drop wise condensation –Nusselt's Theory of Condensation on a vertical plate - Film condensation on vertical and horizontal cylinders using empirical correlations.

UNIT V

Heat Exchangers: Classification of heat exchangers – overall heat transfer Coefficient and fouling factor – Concepts of LMTD and NTU methods - Problems using LMTD and NTU methods.

Radiation Heat Transfer: Emission characteristics and laws of black-body radiation – Irradiation – total and monochromatic quantities – laws of Planck, Wien, Kirchhoff, Lambert, Stefan and Boltzmann– heat exchange between two black bodies – concepts of shape factor – Emissivity – heat exchange between grey bodies – radiation shields – electrical analogy for radiation networks.

Outcome: Knowledge and understanding how heat and energy is transferred between the elements of a system for different configurations, Solve problems involving one or more modes of heat transfer.

TEXT BOOKS:

1. Heat Transfer / Ozisik/ McGraw-Hill Publishers
2. Heat and Mass Transfer / Yadav /Centre Publishing House
3. Heat and Mass Transfer / D.S.Kumar / S.K.Kataria & Sons Publishers

REFERENCE BOOKS:

1. Fundamentals of Heat Transfer & Mass Transfer / Incropera & Dewitt / John Wiley Pub.
2. Fundamentals of Engg. Heat and Mass Transfer / R.C.SACHDEVA / New Age International
3. Heat Transfer / P.K.Nag/ TMH Publications
4. Heat Transfer / Ghoshdastidar / Oxford University Press – II Edition
5. Heat and Mass Transfer / Cengel- McGraw Hill Publications
6. Heat and Mass Transfer / R.K. Rajput / S.Chand & Company Ltd.
7. Essential Heat Transfer / Christopher A Long / Pearson Education
8. Heat and Mass Transfer Data Book by Kondandaraman

2014-15 **Code: 401A1**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

DISASTER MANAGEMENT
(ELECTIVE - I)

Objectives

- To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences.
- To increase the knowledge and understanding of the International Strategy for Disaster Reduction and to increase skills and abilities for implementing the Disaster Risk Reduction (DRR) Strategy.
- To ensure skills and abilities to analyze potential effects of disasters and of the strategies and methods to deliver public health response to avert these effects.
- To ensure skills and ability to design, implement and evaluate research on disasters

UNIT-I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Types Of Environmental Hazards & Disasters: Natural hazards and Disasters – Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards

UNIT –II

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides – Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions – Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Exogenous Hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters, Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation), Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters-

Man induced Hazards /Disasters- Physical hazards/ Disasters-Soil Erosion Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion, Chemical hazards/ disasters:-- Release of toxic chemicals, nuclear explosion- Sedimentation processes, Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation, Biological hazards/ disasters:- Population Explosion.

UNIT –III

Emerging Approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)

2. Emergency Stage

3. Post Disaster stage-Rehabilitation

Natural Disaster Reduction & Management

a) Provision of Immediate relief measures to disaster affected people

b) Prediction of Hazards & Disasters

c) Measures of adjustment to natural hazards

UNIT –IV

Disaster Management- An Integrated Approach For Disaster Preparedness, Mitigation & Awareness.

Mitigation- Institutions- discuss the work of following Institution.

a. Meteorological observatory

b. Seismological observatory

c. Volcanology instituition

d. Hydrology Laboratory

e. Industrial Safety inspectorate

f. Institution of urban & regional planners

g. Chambers of Architects

h. Engineering Council

i. National Standards Committee

Integrated Planning- Contingency management Preparedness –

a) Education on disasters

b) Community involvement

c) The adjustment of Human Population to Natural hazards & disasters Role of Media Monitoring Management- Discuss the programme of disaster research & mitigation of disaster of following organizations.

a) International Council for Scientific Unions (ICSU)- Scientific committee on problems of the Environment (SCOPE), International Geosphere- Biosphere programme (IGBP)

b) World federation of Engineering Organizations(WFED)

c) National Academy of Sciences

d) World Meteorological organizations(WMO)

e) Geographical Information System(GIS)

f) International Association of Seismology & Physics of Earth's Interior (IASPEI)

g) Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNEP.

UNIT –V

a. A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills with particular reference to India

b. Ecological planning for sustainability & sustainable development in India- Sustainable rural development: A Remedy to Disasters -Role of Panchayats in Disaster mitigations

c. Environmental policies & programmes in India- Institutions & National Centres for Natural

Disaster reduction, Environmental Legislations in India, Awareness, Conservation Movement,

Education & training

Outcomes

- Capacity to integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels.
- Capacity to describe, analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.
- Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
- Capacity to manage the Public Health aspects of the disasters.
- Capacity to obtain, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

TEXT BOOK:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni

REFERENCE BOOKS:

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
3. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
4. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
5. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
6. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
7. R.K. Bhandani An overview on Natural & Manmade Disaster & their Reduction, CSIR, New Delhi
8. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001.

2014-15 **Code: 40B04**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

HUMAN VALUES & PROFESSIONAL ETHICS
(ELECTIVE - I)

UNIT-I

Human Values: Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Time management-Valuing Time – Cooperation – Commitment – Empathy – Self-Confidence – Character. Corporate Social responsibility, Social responsibility as a citizen of this great country.

UNIT-II

Self Management: SELF Concept Learning Enhancement Facilitation Centre, University of Weston Sydney, Australia. A New Idea of Self Constructs, Self discipline, understanding self, Self Exploration, need and purpose. Assessment procedures and types, importance of Self assessment/appraisal systems. Gardeners multiple intelligence concept. Key to success and road map to success. Untrained/Trained Memory.

UNIT-III

Engineering Ethics: Code of ethics for engineers, ASCE, ASME Codes of ethical conduct of engineers, Personal ethics, Professional ethics, Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry – moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory –uses of ethical theories– Models of Professional Roles - theories about right action - Self-interest - customs and religion professional rights - employee rights - Intellectual Property Rights (IPR), Trade marks, Patents, copy rights. Some interesting case studies.

UNIT-IV

Value Education: Concept of Value education, its intensions, the need for value education in today's context, basic guidelines for value education, the contents of value education and the process of value education. Universal Brotherhood, spirituality, Basic human aspirations, harmony: self, family and society.

UNIT-V

Stress Management: Types of Stress, Positive Stress (Eustress) and rewarding experiences, Negative Stress (Distress) and its influence on human health, Methods of Stress Management for better living. Meditation, Laughter is the best medicine, Anger management. Personality development. Study & Learning skills, need to develop a positive attitudes, brain & behaviour, respect for authority, responsibility, accountability, confidentiality etc..

TEXTBOOK

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

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",
3. Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available) 2003.
4. C.G.Krishnadas Nair, "Engineering Ethics", Harishree Publishing Company, Bangalore.
5. R.K.Shukla, Anuranjan Mishra,"Human Values and Professional Ethics" Published by A.B.Publication.

2014-15 **Code: 40B05**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
4	1/-/-	4

INTELLECTUAL PROPERTY RIGHTS
(ELECTIVE - I)

UNIT I

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property i. Movable Property ii. Immovable Property and iii. Intellectual Property.

UNIT II

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures..

UNIT III

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT).

UNIT IV

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

UNIT V

Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

TEXT BOOKS

1. Subbaram N.R. “Handbook of Indian Patent Law and Practice “, S. Viswanathan Printers and Publishers Pvt. Ltd., 1998.

REFERENCES

1. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010
2. Prabhuddha Ganguli: ‘ Intellectual Property Rights” Tata Mc-Graw –Hill, New Delhi
3. M.Ashok Kumar and Mohd.Iqbal Ali: “Intellectual Property Right” Serials Pub.

2014-15 **Code: 40328**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
0	-/3/-	2

HEAT TRANSFER LAB

Pre-requisite: Heat Transfer

Objective: The objective of this lab is to provide knowledge about Heat transfer through lagged pipe , Natural and forced convection, black body radiation.

Outcome: The student shall be able to know heat transfer due to conduction, convection and radiation.

Codes/Tables: Heat and Mass Transfer data book

1. Composite Slab Apparatus – Overall heat transfer co-efficient.

2. Heat transfer through lagged pipe.

3. Heat Transfer through a Concentric Sphere

4. Thermal Conductivity of given metal rod.

5. Heat transfer in pin-fin apparatus

6. Experiment on Transient Heat Conduction

7. Heat transfer in forced convection apparatus.

8. Heat transfer in natural convection

9. Parallel and counter flow heat exchanger.

10. Emissivity apparatus.

11. Stefan Boltzman Apparatus.

12. Heat transfer in drop and film wise condensation.

13. Critical Heat flux apparatus.

14. Study of heat pipe and its demonstration.

15. Study of Two – Phase flow.

Note: Any 10 of the above 15 experiments are to be conducted.

2014-15 **Code: 40329**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

III Year B.Tech. ME II-Sem

L	T/P/D	C
0	-/3/-	2

THERMAL ENGINEERING LAB

Pre-requisite: Thermal Engineering –I, Thermal Engineering-II

Objective: The objective of this Lab is to provide knowledge about valve timing operations and performance of IC engines.

Codes/Tables: Nil

Perform any 10 out of the 12 Experiments

1. I.C. Engines Valve / Port Timing Diagrams
2. I.C. Engines Performance Test(4 -Stroke Diesel Engines)
3. I.C. Engines Performance Test on 2-Stroke Petrol
4. Evaluation of Engine friction by conducting Morse test on 4-Stroke Multi cylinder Petrol Engine
5. Evaluate of engine friction by conducting motoring /retardation test on 4 stroke diesel Engine.
6. Heat balance on IC Engines.
7. Determination of A/F Ratio and Volumetric Efficiency on IC Engines.
8. Determine of Economical speed test for fixed load on 4-stroke Engine.
9. Determine optimum cooling water temperature on IC Engine
10. Dis-assembly / Assembly of Engines.
11. Performance test on Reciprocating Air-compressor unit.
12. Study of Boilers.

Outcome: The student shall be able to know the performance of petrol engines and diesel engines, how to calculate the performance of refrigeration system.

2014-15 **Code: 40330**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

OPERATIONS RESEARCH

Pre-requisite: Mathematics

Objective: The objective of this subject is to provide knowledge of solving the models for their optimal solutions.

Codes/Tables: Nil

UNIT – I

Development – Definition– Characteristics and Phases – Types of models – operation Research models – applications.

Allocation: Linear Programming Problem Formulation – Graphical solution – Simplex method –Artificial variables techniques -Two–phase method, Big-M method – Duality Principle.

Transportation Problem – Formulation – Optimal solution, unbalanced transportation problem –Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.

UNIT – II

Sequencing – Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

Theory of Games: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – dominance principle – m X 2 & 2 X n games - graphical method.

UNIT – III

Waiting Lines: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

UNIT – IV

Inventory : Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost-single period model.

UNIT – V

Dynamic Programming: Introduction – Terminology-Bellman's Principle of optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages –Brief introduction of Simulation Languages.

Outcome: By the end of the course the student should have developed the skills to consider real-world problems and determine whether or not linear programming is an appropriate modeling framework; solve the models for their optimal solutions; interpret the models' solutions and infer solutions to the real-world problems

TEXT BOOK:

1. Introduction to O.R /Taha/PHI Publishers
2. Operations Research / S.D.Sharma/Kedarnath Publisher
3. Introduction to O.R/Hiller & Libermann/McGraw Hill Publications

REFERENCE BOOKS:

1. Operations Research /A.M.Natarajan, P.Balasubramani,A. Tamilarasi/Pearson Education.
2. Operations Research: Methods & Problems / Maurice Saseini, Arhur Yaspan & Lawrence Friedman/ Literary Licensing
3. Operations Research / R.Pannerselvam,PHI Publications.
4. Operations Research / Wagner/ PHI Publications.
5. Operation Research /J.K.Sharma/MacMilan Publisher
6. O.R/Wayne L.Winston/ Thomson/Brooks/Cole Publisher

2014-15 **Code: 40331**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

POWER PLANT ENGINEERING

Pre-requisite: Thermal engineering - II

Objective: The objective of this subject is to provide knowledge Power generating units.

Codes/Tables: Steam tables.

UNIT – I

Introduction to the Sources of Energy – Resources and Development of Power in India.

Steam Power Plant: Plant Layout, Working of different Circuits, Fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, Ash handling systems.

Combustion Process: Properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction, Dust collectors, cooling towers and heat rejection. Corrosion and feed water treatment.

UNIT – II

Internal Combustion Engine Plant: DIESEL POWER PLANT: Introduction – IC Engines, types, construction– Plant layout with auxiliaries – fuel supply system, air starting equipment, lubrication and cooling system – super charging.

Gas Turbine Plant: Introduction – classification - construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines. Combined Cycle Power Plants and comparision.

UNIT – III

Hydro Electric Power Plant: Water power – Hydrological cycle / flow measurement – drainage area characteristics – Hydrographs – storage and Pondage – classification of dams and spill ways.

Hydro Projects and Plant: Classification – Typical layouts – plant auxiliaries – plant operation pumped storage plants.

Power From Non-Conventional Sources: Utilization of Solar- Collectors- Principle of Working, Wind Energy – types – HAWT, VAWT -Tidal Energy**.**

DIRECT ENERGY CONVERSION: Solar energy, Fuel cells, Thermo electric and Thermo ionic, MHD generation.

UNIT – IV

Nuclear Power Station: Nuclear fuel – breeding and fertile materials – Nuclear reactor –reactor operation.

Types of Reactors: Pressurized water reactor, Boiling water reactor, sodium-graphite reactor, fast Breeder Reactor, Homogeneous Reactor, Gas cooled Reactor, Radiation hazards and shielding – radioactive waste disposal.

UNIT – V

Power Plant Economics and Environmental Considerations: Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, Load curves, load duration curve. Definitions of connected load, Maximum demand, demand factor, average load, load factor, diversity factor – related exercises. Effluents from power plants and Impact on environment – pollutants and pollution standards – Methods of Pollution control.

Outcome: To assess the students progress towards power plants design and working principle of the power plants, economics, and their impact on environment.

TEXT BOOK:

1. A Course in Power Plant Engineering: / Arora and S. Domkundwar/ Dhanpat Rai Publisher
2. Power Plant Engineering / P.C.Sharma / S.K.Kataria Publisher

REFERENCE BOOKS:

1. Power Plant Engineering/ P.K.Nag II Edition /TMH Publishers

2. Power plant Engineering/ Ramalingam/ Scietech Publishers

3. Power station Engineering/ ElWakil / McHill Publisher

4. An Introduction to Power Plant Technology / G.D. Rai/Khanna Publishers

5. Power plant Engg /Elanchezhian/I.K. International Pub.

6. A Text Book of Power Plant Engineering / Rajput / Laxmi Publications

2014-15 **Code: 40332**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

CAD / CAM

Pre-requisite: Engineering Drawing,Machine drawing and Machine Tools

Objective: The objective of this subject is to provide knowledge of drafting 2D and 3D drawings.

Codes/Tables: Nil

UNIT – I

Computers in Industrial Manufacturing, Product cycle, CAD / CAM Hardware, Basic structure, CPU, Memory types, input devices, display devices, hard copy devices, storage devices.

Computer Graphics: Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, mathematics of projections, clipping, hidden surface removal.

UNIT – II

Geometric modeling: Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired.

UNIT – III

Drafting and Modeling systems: Basic geometric commands, layers, display control commands, editing, dimensioning, solid modeling.

Numerical control: NC, NC modes, NC elements, NC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming fundamentals, manual part programming methods, Computer Aided Part Programming.

UNIT – IV

Group Tech: Part family, coding and classification, production flow analysis, advantages and limitations, Computer Aided Processes Planning, Retrieval type and Generative type.

UNIT – V

Computer Aided Quality Control: Terminology in quality control, the computer in QC, contact inspection methods, noncontact inspection methods-optical, noncontact inspection methods-nonoptical, computer aided testing, integration of CAQC with CAD/CAM.

Computer integrated manufacturing systems: Types of Manufacturing systems, Machine tools and related equipment, material handling systems, computer control systems, human labor in the manufacturing systems, CIMS benefits.

Outcome: The learning outcomes are assessed through the assignment and various practical performed modeling, drafting, computer aided quality control and computer integrated manufacturing systems.

TEXT BOOK:

1. CAD / CAM Theory and Practice / Ibrahim Zeid / TMH Publishers
2. CAD / CAM /A Zimmers & P.Groover/PE/PHI Publishers

REFERENCE BOOKS:

1. Automation, Production systems & Computer integrated Manufacturing/ Groover/Pearson Education
2. CAD / CAM / CIM / Radhakrishnan and Subramanian / New Age Publishers
3. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson Edu
4. CAD/CAM: Concepts and Applications/Alavala/ PHI Publishers
5. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson Publishers

2014-15 **Code: 40333**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	-/-/-	4

INSTRUMENTATION AND CONTROL SYSTEMS

Pre-requisite: Metrology

Objective: The objective of this subject is to provide knowledge of measuring temperature, pressure and displacement with instruments.

Codes/Tables: Nil

UNIT – I

Definition – Basic principles of measurement – Measurement systems, generalized configuration and functional descriptions of measuring instruments – examples. Dynamic performance characteristics – sources of error, Classification and elimination of error.

Measurement of Displacement: Theory and construction of various transducers to measure displacement – Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers, Calibration procedures.

UNIT – II

Measurement of Temperature: Classification – Ranges – Various Principles of measurement – Expansion, Electrical Resistance – Thermistor – Thermocouple – Pyrometers – Temperature Indicators..

Measurement of Pressure: Units – classification – different principles used. Manometers, Piston, Bourdon pressure gauges, Bellows – Diaphragm gauges. Low pressure measurement – Thermal conductivity gauges – ionization pressure gauges, Mcleod pressure gauge.

Measurement of Level: Direct method – Indirect methods – capacitative, ultrasonic, magnetic, cryogenic fuel level indicators – Bubler level indicators.

UNIT – III

Flow Measurement: Rotameter, magnetic, Ultrasonic, Turbine flow meter, Hot – wire anemometer, Laser Doppler Anemometer (LDA).

Measurement of Speed: Mechanical Tachometers – Electrical tachometers – Stroboscope, Noncontact type of tachometer

Measurement of Acceleration and Vibration: Different simple instruments – Principles of Seismic instruments – Vibrometer and accelerometer using this principle.

UNIT – IV

Stress Strain Measurements: Various types of stress and strain measurements – electrical strain gauge – gauge factor – method of usage of resistance strain gauge for bending compressive and tensile strains – usage for measuring torque, Strain gauge Rosettes.

Measurement of Humidity – Moisture content of gases, sling psychrometer, Absorption psychrometer, Dew point meter.

UNIT – V

Measurement of Force, Torque And Power- Elastic force meters, load cells, Torsion meters, Dynamometers.

Elements of Control Systems: Introduction, Importance – Classification – Open and closed systems Servomechanisms– Examples with block diagrams–Temperature, speed & position control systems.

Outcome: At the end of this course the students will able to understand the different mechanical measurement systems and working and testing procedures.

TEXT BOOKS:

1. Mechanical Measurements / BeckWith, Marangoni,Linehar/ PHI Publisher
2. Measurement Systems:Applications & design / D.S Kumar/McGrawHill Publishers

REFERENCE BOOKS:

1. Experimental Methods for Engineers / Holman/ McGraw-Hill Education
2. Measurement systems: Application and design, Doeblin Earnest. O. Adaptation by Manik and Dhanesh/ TMH Publishers
3. Instrumentation and Control systems/ S.Bhaskar/ Anuradha Agencies.
4. Mechanical and Industrial Measurements / R.K. Jain/ Khanna Publishers.
5. Instrumentation & mech. Measurements / A.K. Tayal / Galgotia Publications
6. Instrumentation, measurement & analysis / B.C.Nakra & K.K.Choudhary / TMH Publishers
7. Mechanical Measurements /sahani/McGraw Hill Publishers

2014-15 **Code: 403B1**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/ - /-	4

ROBOTICS
(ELECTIVE – II)

Pre-requisite: Kinematics and dynamics of machinery

Objective: The objective of this subject is to provide knowledge of automation of Industries and design of robot arm, kinematics and dynamics, Trajectory planning of robot and its applications.

Codes/Tables: Nil

UNIT – I

Introduction: Automation and Robotics, CAD/CAM and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system.

Components of the Industrial Robotics: Function line diagram representation of robot arms, common types of arms. Components, Architecture, number of degrees of freedom – Requirements and challenges of end effectors, determination of the end effectors, comparison of Electric, Hydraulic and Pneumatic types of locomotion devices.

UNIT – II

Motion Analysis: Homogeneous transformations as applicable to rotation and translation – problems.

Manipulator Kinematics: Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

UNIT – III

Differential transformation and manipulators, Jacobians – problems.

Dynamics: Lagrange – Euler and Newton – Euler formations – Problems.

Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

UNIT -IV

Robot actuators and Feedback components: Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors. Feedback components: position sensors – potentiometers, resolvers, encoders – Velocity sensors.

UNIT V

Robot Application in Manufacturing: Material Transfer - Material handling, loading and unloading- Processing - spot and continuous arc welding & spray painting - Assembly and Inspection.

Outcome: At the end of this course the student can understand the Robot motions in different paths and their applications in manufacturing.

TEXT BOOKS:

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Robotics and Control / Mittal R K & Nagrath I J / TMH.

REFERENCE BOOKS:

1. Robotics / Fu K S/ McGraw Hill.
2. An Introduction to Robot Technology, / P. Coiffet and M. Chaironze / Kogam Page Ltd. 1983 London.
3. Robotic Engineering / Richard D. Klafter/ Prentice Hall Publishers
4. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.
5. Introduction to Robotics / John J Craig / Pearson Edu.
6. Robot Dynamics & Control / Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pvt Ltd.

2014-15 **Code: 403B2**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

MECHANICAL VIBRATIONS
(ELECTIVE – II)

UNIT-I

Introduction: Importance and scope ,definition and terminology, simple harmonic motion, combination of simple harmonic motions, Fourier analysis.

UNIT-II

Single Degree Freedom Systems-I: Undamped free vibration: Classical method, Energy method, phase plane method, equivalent systems, torsional systems.

Single Degree Freedom Systems-II: Damped free vibration: Viscous damping, under damping, critical damping, coulomb damping, equivalent damping coefficient

Single Degree Freedom Systems With Forced Vibrations: Steady state forced vibration, sources of excitation, impressed harmonic force, impressed force due to unbalance, motion excitation, transmissibility and isolation, performance of different type of isolators, power absorbed by viscous damping, General theory of seismic instruments, accelerometer and vibrometer, methods of vibration control, excitation reduction at source, system modification.

UNIT-III

Two Degree Freedom Systems: Natural frequencies and modes of vibration by classical method of spring-mass system, forced vibration, dynamic vibration absorber

UNIT-IV

Multi Degree Freedom Systems: Influence co-efficient method, damped mass and distributed mass systems, stodola method, Holzer's method, newtons iteration method, orthogonality of mode shapes.

UNIT-V

Vibration In Cintinuous Systems: Longitudinal vibration of bars, torsional vibrations of circular rods or shafts, lateral vibrations of beams and shafts.

Whirling of shafts critical speed of shafts, Rayleigh's upper bound approximation, Dunkerley's lower bound approximation, critical speed of shafts with damping.

TEXT BOOK:

1. Mechanical Vibrations / G.K.Grover/ Nem Chand Publisher

2. Theory and practice of mechanical Vibrations / J.S.Rao and K.Gupta / New Age International Publishers

REFERENCE BOOKS:

1. Vibration Theory and Applications / W.T.Thomson/ CRC Press Publishers

2. Vibration problems in Engineering / Timeshenko and Young / Oxford City Press Publishers

3. Mechanical Vibrations / S.S. Rao/ Pearson Edu

4. Principles of Vibrations / Tongue/ Oxford Univ. Press

5. Mechanical Vibration / Shyam Series.

2014-15 **Code: 403B3**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

MECHATRONICS
(ELECTIVE – II)

UNIT – I

Introduction: Definition – Trends - Control Methods: Standalone, PC Based (Real Time Operating Systems, Graphical User Interface, and Simulation) - Applications: SPM, Robot, CNC, FMS, CIM.

UNIT – II

Signal Conditioning : Introduction – Hardware - Digital I/O , Analog input – ADC , resolution , sped channels Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps –Software - Digital Signal Processing – Low pass , high pass , notch filtering

Electronic Interface Subsystems : TTL, CMOS interfacing - Sensor interfacing – Actuator interfacing – solenoids , motors Isolation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers , over current sensing , resettable fuses , thermal dissipation - Power Supply - Bipolar transistors / mosfets

UNIT – III

Precision Mechanical Systems : Pneumatic Actuation Systems - Electro-pneumatic Actuation Systems - Hydraulic Actuation Systems - Electro-hydraulic Actuation Systems - Timing Belts – Ball Screw and Nut - Linear Motion Guides - Linear Bearings - Harmonic Transmission - Bearings- Motor / Drive Selection.

Electromechanical Drives : Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives , PWM's - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

UNIT – IV

Microcontrollers Overview : 8051 Microcontroller , micro processor structure – Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications. Programming –Assembly, C (LED Blinking, Voltage measurement using ADC).

Programmable Logic Controllers : Basic Structure - Programming : Ladder diagram - Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling - Analog input / output - PLC Selection - Application.

UNIT – V

Programmable Motion Controllers : Introduction - System Transfer Function – Laplace transform and its application in analysing differential equation of a control system - Feedback Devices : Position , Velocity Sensors - Optical Incremental encoders - Proximity Sensors , Inductive , Capacitive , Infrared - Continuous and discrete processes - Control System Performance & tuning - Digital Controllers - P, PI , PID Control - Control modes – Position , Velocity and Torque - Velocity Profiles – Trapezoidal - S. Curve - Electronic Gearing - Controlled Velocity Profile - Multi axis Interpolation , PTP , Linear , Circular - Core functionalities – Home , Record position , Go to Position - Applications : SPM, Robotics.

TEXT BOOKS:

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI Publishers

REFERENCE BOOKS:

1.Mechatronics Source Book/Newton C Brag / Thomson Publications, Chennai.
2.Mechatronics / N. Shanmugam / Anuradha Agencies Publisers.
3.Mechatronics System Design / Devdas shetty,Richard/Thomson Publishers

2014-15 **Code: 403B4**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1 /-/-	4

COMPOSITE MATERIALS
(ELECTIVE – II)

UNIT-I

Introduction to Composite Materials: Introduction, Classification: Polymer Matrix Composites. Metal Matrix Composites, Ceramic Matrix Composites, Carbon–Carbon Composites, Fiber. Reinforced Composites and nature-made composites, and applications

Reinforcements: Fibres- Glass, Silica, Kevlar, carbon, boron, silicon carbide, and boron carbide. fibres. Particulate composites, Polymer composites, Thermoplastics, Thermosets, Metal matrix and ceramic composites.

Manufacturing methods: Autoclave, tape production, moulding methods, filament winding, man layup, pultrusion, RTM.

UNIT-II

Macromechanical Analysis of a Lamina: Introduction, Definitions, Stress, Strain, Elastic Moduli, Strain Energy. Hooke's Law for Different Types of Materials, Hooke's Law for a Two Dimensional Unidirectional Lamina, Plane Stress Assumption, Reduction of Hooke's Law in Three Dimensions to Two Dimensions, Relationship of Compliance and Stiffness Matrix to Engineering Elastic Constants of a Lamina.

UNIT-III

Hooke's Law for a Two-Dimensional Angle Lamina, Engineering Constants of an Angle Lamina. Invariant Form of Stiffness and Compliance Matrices for an Angle Lamina Strength Failure. Envelopes, Maximum Strain Failure Theory ,Tsai–Hill Failure Theory, Tsai–Wu Failure Theory Comparison of Experimental Results with Failure Theories. Hydrothermal Stresses and Strains in a Lamina: Hydrothermal Stress–Strain Relationships for a Unidirectional Lamina, Hydrothermal Stress–Strain Relationships for an Angle Lamina

UNIT-IV

Micromechanical Analysis of a Lamina: Introduction, Volume and Mass Fractions,

Density, and Void Content, Evaluation of the Four Elastic Moduli, Strength of Materials Approach, Semi Empirical Models ,Elasticity Approach, Elastic Moduli of Lamina with Transversely Isotropic Fibers, Ultimate Strengths of a Unidirectional Lamina, Coefficients of Thermal Expansion, Coefficients of Moisture Expansion

Macromechanical Analysis of Laminates: Introduction, Laminate Code, Stress– Strain Relations for a Laminate, In-Plane and Flexural Modulus of a Laminate , Hydrothermal Effects in a Laminate, Warpage of Laminates

UNIT-V

Failure Analysis and Design of Laminates: Introduction , Special Cases of Laminates, Failure Criterion for a Laminate, Design of a Laminated Composite, Other Mechanical Design Issues

TEXT BOOKS:

1. Engineering Mechanics of Composite Materials / Isaac and M Daniel / Oxford Univ. Press, 1994.
2. Mechanics of Composite Materials / R. M. Jones / Mc Graw Hill Company /New York, 1975.

REFERENCE BOOKS:

1. Analysis and performance of fibre Composites / B. D. Agarwal and L.. J. Broutman Wiley / Interscience, New York, 1980.
2. Mechanics of Composite Materials, (Mechanical Engineering) / Autar K. Kaw, 2/e / CRC Pubi.
3. Composite Materials Science and Engineering / Kishan K. Chawla / Springer, 2009
4. Analysis of Laminated Composite Structures/ L.R. Calcote, Van Nostrand Rainfold/ New York, 1969.
5. Machanics of Composite Materials and Structures / madhujit Mukhpadhyay /New York, 1969.
6. Finite Element Analysis of Composite Materials / Ever J. Barbero / CRC Press, 2077

2012-2013 **Code: 30B03**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. ME I-Sem

L	T/P/D	C
4	-/-/-	4

INDUSTRIAL MANAGEMENT
(ELECTIVE – II)

UNIT I

Introduction to Management: Entrepreneurship and organization-nature and importance of management, Functions of management, Taylor's scientific Management Theory, Fayols Principles of management. Maslows Theory of Human Needs, Douglas McGregor's Theory X and Theory Y,herzbergs Two-Factor Theory of Motivation, system Approach to Management, Leadership Styles, Social responsibilities of Management.

UNIT II

Designing Organizational Structures: Departmentation and decentralization, Types of Organizational Structures-line Organization , Line and Staff Organization, functional Organization, committee Organization, matrix Organization, Virtual Organization, Cellular Organization, Team structure, boundary less organization, inverted pyramid structure lean and flat organization structure and their merits, demerits and suitability.

UNIT III

Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass production), Work Study –Basic procedure involved in Method Study and Work Measurement-Statistical

Quality Control: X chart, R chart, C chart, P chart, (simple problems), Acceptance Sampling, Deming's contribution to quality,

a) **Material Management:** Objectives, Need for Inventory Control, EOQ, ABC Analysis, Purchase procedure, Store Management and Stores Records –Supply Chain Management
b) **Marketing:** Functions of Marketing, Marketing Mix, Marketing Strategies based on Product life Cycle., Channels of Distribution

UNIT IV

Human Resource Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower Planning, Recruitment, Selection, Training and Development, Placement, Wage and salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Project Management: (PERT/CPM): Network Analysis, 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)

UNIT V

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of corporate planning process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, generic Strategy Alternatives.

Contemporary Management Practices: Basic Concepts of Just -In-Time (JIT) systems, Total Quality Management (TQM), Six sigma and capability maturity modal (CMM) levels, Value Chain Analysis, Entrepreneurship Resource Planning (ERP), Performance Management, business process Outsourcing (BPO), Business process re-engineering 5s Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Bench marking, Balanced Score Card.

TEXT BOOKS

1. Aryasri: Management Science, TMH, New Delhi, 2009.

REFERENCE BOOKS

1. Stoner, Management, Person, 2009.
2. Kotler philipand Keller Kevin Lane: Marketing Management PHI, 2009.
3. Koontz, Weihrich, and Aryasri: Principles of Management, TMH, 2009.
4. Thomas N.Duening & John M. Ivancevich Management, Principles and Guidelines, Cengeage, 2009.
5. Kaniska Bedi, Production and Operations management, Oxford University Press, 2009.
6. Memoria & S.V. Ganker, Personnel Management, Himalaya, 2009.
7. Schermerhon: Management, Wiley, 2009.
8. Parnell: Stragic Management, Biztantra, 2009.
9. L.S.Srinath: PERT/CPM, Affiliated East-West Press, 2009.
10. William J.Stevenson & Ceyehun Ozgur: Introduction to Management Science, TMH, 2007.

2014-15 **Code: 403C1**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

UNCONVENTIONAL MACHINING PROCESSES
(ELECTIVE – III)

Pre-requisite: Machine Tools and Renewable Energy Sources.

Objective: The objective of this subject is to provide knowledge of using different energy sources like mechanical, Electrical, Laser beam etc.

Codes/Tables: Nil

UNIT – I

Introduction: Need for non-traditional machining methods-Classification of modern machining processes – considerations in process selection - Materials - Applications.

Ultrasonic machining – Elements of the process, mechanics of metal removal process parameters, economic considerations, applications and limitations, recent development.

UNIT – II

Abrasive jet machining, Water jet machining and abrasive water jet machine : Basic principles, equipments, process variables, mechanics of metal removal, MRR, application and limitations.

Electro – Chemical Processes : Fundamentals of electro chemical machining, electrochemical grinding, electro chemical honing and deburring process, metal removal rate in ECM, Tool design, Surface finish and accuracy economic aspects of ECM – Simple problems for estimation of metal removal rate. Fundamentals of chemical, machining, advantages and applications.

UNIT - III

Thermal Metal Removal Processes : General Principle and applications of Electric Discharge Machining, Electric Discharge Grinding and electric discharge wire cutting processes – Power circuits for EDM, Mechanics of metal removal in EDM, Process parameters, selection of tool electrode and dielectric fluids, methods surface finish and machining accuracy, characteristics of spark eroded surface and machine tool selection. Wire EDM, principle, applications.

UNIT – IV

Generation and control of electron beam for machining, theory of electron beam machining, comparison of thermal and non-thermal processes –General Principle and application of laser beam machining – thermal features, cutting speed and accuracy of cut.

UNIT-V

Application of plasma for machining, metal removal mechanism, process parameters, accuracy and surface finish and other applications of plasma in manufacturing industries. Chemical machining-principle- maskants –etchants-applications.

Magnetic abrasive finishing, Abrasive flow finishing, Electrostream drilling, Shaped tube electrolytic machining.

Outcome: Students will understand the principle of operation of the non-conventional machining techniques (eg electro-discharge machining (EDM), wire erosion, ultrasonic machining, etching of electronic printed circuit boards (PCBs), laser-beam machining, plasma-jet machining), specification of components for non-conventional machining techniques and *Tooling requirements*: tooling and ancillary equipment needed to perform non-conventional machining techniques; work-holding techniques; health and safety issues

TEXT BOOK:

1. Advanced machining processes/ VK Jain/ Allied publishers.
2. Unconventional machining process / P. K. Mishra / Standard Publishers

REFERENCE BOOKS:

1. Modern Machining Process / Pandey P.C. and Shah H.S./ TMH Publishers
2. New Technology / Bhattacharya A/ The Institution of Engineers/ India 1984.
3. Modern Production and Operations Management / Baffa & Rakesh Sarin/ John Wiley & Sons

2014-15 **Code: 403C2**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

CNC TECHNOLOGY
(ELECTIVE – III)

UNIT-I

Features of NC Machines: Fundamentals of Numerical Control, advantages of NC systems, classifications of NC systems, point to point, NC and CNC, incremental and absolute, open and closed loop systems, Features of N/C Machine Tools, Design consideration of NC machine tool, methods of improving machine accuracy.

NC Part Programming: Manual Programming- Basic concepts, point to point counter programming canned cycles, parametric programming.

UNIT-II

CNC Machine Elements: Machine Structure- Guide ways- feed drives-spindles- spindle bearings – measuring systems- Tool monitoring systems.

Tooling for CNC Machines: Interchangeable tooling system, preset and qualified tools, coolant fed tooling systems, modular fixturing, quick change tooling system, automatic head changers.

UNTI-III

Compute-Aided Programming: General information, APT programming Examples Apt programming problems (2D machining only) NC programming on CAD/CAM Systems, the design and implementation of post processors Introduction to CAD/CAM Software, Automatic Tool path generation

UNIT-IV

DNC Systems and Adaptive control: Introduction type of DNC systems, advantages and disadvantages of DNC, adaptive control with optimization, Adaptive control with constraints, Adaptive control of machining process like turning, grinding.

UNIT-V

Micro Controllers: Introduction, Hardware components, I/O pins, ports external memory, counters, timers and serial data I/O INTERRUPTS. Selection of Micro Controllers, Embedded Controllers, Applications and Programming of Micro Controllers.

Programming Logic Controllers (PLC'S): Introduction, Hardware components of PLC, system, basic structure principles of operations, programming mnemonics timers, Internal relays and counters, Applications of PLC'S in CNCMachines.

TEXT BOOKS:

1. Computer Control of Manufacturing systems / Yoram Koren / Mc Graw Hill Publishers
2. CAD/CAM- /Michel P.Groover / TMH Publishers

REFERENCE BOOKS:

1. Machining Tools Hand Book / Vol 3, (Automation and Control)/ Manfred Week/ John Wiley and Sons, 1984
2. Mechatronics / HMT Publishers
3. Production Technology / HMT Publishers

2014-15 **Code: 403C3**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

AUTOMATION IN MANUFACTURING
(ELECTIVE – III)

UNIT – I

Introduction Types and strategies of automation, pneumatic and hydraulic components circuits, Automation in machine tools. Mechanical feeding and too changing and machine tool control transfer the automaton.

UNIT – II

Automated flow lines: Methods or work part transport transfer Mechanical buffer storage control function, design and fabrication consideration.

Analysis of Automated flow lines: General terminology and analysis of transfer lines without and with buffer storage, partial automation, implementation of automated flow lines.

UNIT – III

Assembly system and line balancing: Assembly process and systems assembly line, line balancing methods, ways of improving line balance, flexible assembly lines.

Automated material handling: Types of equipment, functions, analysis and design of material handling systems conveyor systems, automated guided vehicle systems.

UNIT -IV

Automated storage systems, automated storage and retrieval systems, work in process storage, interfacing handling and storage with manufacturing.

Adaptive control systems: Introduction, adaptive control with optimization, Adaptive control with constraints, Application of A.C. in machining operations. Use of various parameters such as cutting force, Temperatures, vibration and acoustic emission.

UNIT – V

Business process Re-engineering: Introduction to BPE logistics, ERP, Software configuration of BPE, concurrent Engineering, Techniques of Rapid Proto typing.

TEXT BOOK:

1. Automation, Production Systems and Computer Integrated Manufacturing: M.P. Groover. / PE/PHI Publishers

REFERENCE BOOKS:

1. Computer control of Manufacturing Systems by Yoram Coreom / TMH Publishers
2. CAD / CAM/ CIM by Radhakrishnan / New Age International Publishers
3. Automation by W. Buekinsham / Prometheus Books Publishers

2014-15 **Code: 403C4**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
4	1/-/-	4

DESIGN FOR MANUFACTURING
(ELECTIVE – III)

UNIT-I

Introduction: Design philosophy- Steps in Design process- General Design rules for Manufacturability- Basic principles of designing for economical production- Creativity in design.

UNIT-II

Materials: Selection of Material for Design- Development in Material Technology- Criteria for Material Selection- Material selection interrelationship with process selection-process selection chart.

Machining Process: Overview of various machining process- general desgn rules for machining- Dimensional tolerance and surface roughness- Design for Machining ease- Redesigning of components for machining ease with suitable examples, General design recommendations for machined parts.

UNIT-III

Metal Casting: Appraisal of various casting process, Selection of casting process, General design considerations for casting-casting tolerances-use of solidification simulation in casting design-product design rules for sand casting.

Metal Joining: Appraisal of various welding processes, Factors in design of weldments-General design guidelines-pre and post treatment of welds-Effects of thermal stresses in weld joints-design of brazed joints.

UNIT-IV

Forging: Design factors for forging-closed die forging design- parting lines of dies-drop forging die design-General design recommendations.

Extrusion, Sheet Metal Work & Plastics:

Design guide lines for extruded sections-design principles for punching, blanking, bending, deep drawing-keeler Goodman forming limit diagram-component design for blanking.

UNIT-V

Design for Assembly: General design guidelines for manual assembly-Development of systematic DFA M Methodology. Assembly Efficiency-Classification system for Manual handling- Classification system for Manual Insertion and Fastening. Effect of part symmetry on handling time.

TEXT BOOKS:

1. Product Design for Manufacture and Assembly/ Geoffrey Boothroyd/ Marcel Dekker Inc.NY,2006
2. Product design/ Kevin Otto and Kristin Wood/ Pearson Education Publishers

REFERENCE BOOK:

1. Product design and Manufacturing / A.K Chitale and R.C.Gupta / Prentice-Hall Publishers

2014-15 **Code: 403C5**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. ME I-Sem

L	T/P/D	C
4	1/-/-	4

NANOTECHNOLOGY
(ELECTIVE - III)

UNIT-I

General Introduction: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

Silicon Carbide: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano particles,

Nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano composites,

UNIT-II

Mechanical properties: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties,

Electrical properties: Switching glasses with nanoparticles,Electronic conduction with nano particles

Optical properties: Optical properties, special properties and the coloured glasses

UNIT-III

Process of synthesis of nano powders, Electro deposition, Important naon materials

Investigaing and manipulating materials in the nanoscale: Electron microscopics, scanning probe microscopics, optical microscopics for nano science and technology, X-ray diffraction.

UNIT- IV

Nanobiology : Interaction between bimolecules and naoparticle surface, Different types of inorganic materials used for the synthesis of hybrid nano-bio assemblies, Application of nano in biology, naoprobes for Analytical Applications-A new Methodology in medical diagnostics and Biotechnology,Current status of nano Biotechnology, Future perspectives of Nanobiology, Nanosensors.

UNIT- V

NanoMedicens : Developing of Nanomedicens Nanosytems in use,Protocols for nanodrug Administration, Nanotechnology in Diagnostics applications, materials for used in Diagnostics and Therapeutic applications, Molecular Nanomechanics, Molecular devices, Nanotribology, studying tribology at nanoscale, Nanotribology applications.

TEXT BOOKS:

1. Nano Materials- A.K.Bandyopadhyay/ New Age Publishers.
2. Nano Essentials- T.Pradeep/TMH Publishers

2014-15 **Code: 40334**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
0	-/3/-	2

CAD / CAM LAB

Pre-requisite: Engineering Drawing, Machine drawing and Manufacturing processes.

Objective: The objective of this subject is to provide knowledge of drafting 2D and 3D drawings.

Codes/Tables: Nil

(A**) CAD / CAM LAB :**

1. **Drafting:** Development of part drawings for various components in the form of orthographic and isometric. Representation of Dimensioning and tolerances scanning and plotting. Study of script, DXE AND IGES FILES.

2. **Part Modeling:** Generation of various 3D Models through Protrusion, revolve, shell sweep. Creation of various features. Study of parent child relation. Feature based and Boolean based modeling surface and Assembly Modeling. Study of various standard Translators. Design simple components.

3. a). Determination of deflection and stresses in 2D and 3D trusses and beams.

   b). Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components.

   c). Determination of stresses in 3D and shell structures (at least one example in each case)

   d). Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.

   e). Steady state heat transfer Analysis of plane and Axisymmetric components.

4. a). Development of process sheets for various components based on tooling Machines.

   b). Development of manufacturing and tool management systems.

   c). Study of various post processors used in NC Machines.

   d). Development of NC code for free form and sculptured surfaces using CAM packages.

   e). Machining of simple components on NC lathe and Mill by transferring NC Code / from a CAM package. Through RS 232.

   f) Quality Control and inspection.

Any Six Software Packages from the following:

Use of Auto CAD, Micro Station, CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, Gibbs CAM, Master CAM etc.

Outcome: The student shall be able to know drafting using software like Autocad, Pro-E, Analysis

2014-15 **Code: 40335**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. I-Sem

L	T/P/D	C
0	-/3/-	2

PRODUCTION DRAWING PRACTICE AND INSTRUMENTATION LAB

Pre-requisite: Engineering Drawing, Machine Drawing and Metrology.

Objective: The objective of this subject is to provide knowledge of drawing Part drawings with surface roughness and tolerance values.

Codes/Tables: Nil

(A) PRODUCTION DRAWING PRACTICE

UNIT – I

Conventional representation of Materials – conventional representation of parts – screw joints, welded joints, springs, gears, electrical, hydraulic and pneumatic circuits – methods of indicating notes on drawings.

UNIT – II

Limits and Fits : Types of fits, exercises involving selection / interpretation of fits and estimation of limits from tables.

UNIT – III

Form and Positional Tolerances : Introduction and indication of the tolerances of from and position on drawings, deformation of runout and total runout and their indication.

UNIT – IV

Surface roughness and its indication : Definitions – finishes obtainable from various manufacturing processes, recommended surface roughness on mechanical components. Heat treatment and surface treatment symbols used on drawings.

UNIT – V

Detailed and Part drawings: Drawing of parts from assembly drawings with indications of size, tolerances, roughness, form and position errors etc.

Part drawing using computer aided drafting by CAD software

Outcome: The student shall be able to draw production drawing of various mechanical components with all tolerances, allowances, surface roughness values and process sheet.

TEXT BOOKS:

1. Production and Drawing – K.L. Narayana & P. Kannaiah/ New Age
2. machine Drawing with Auto CAD- Pohit and Ghosh, PE

REFERENCE:

1. Geometric dimensioning and tolerancing- James D. Meadows/ B.S Publications

2. Engineering Metrology, R.K. Jain, Khanna Publications

(B) INSTRUMENTATION LAB:

1. Calibration of Pressure Gauges
2. Calibration of transducer for temperature measurement.
3. Study and calibration of LVDT transducer for displacement measurement.
4. Calibration of strain gauge for temperature measurement.
5. Calibration of thermocouple for temperature measurement.
6. Calibration of capacitive transducer for angular displacement.
7. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
8. Calibration of resistance temperature detector for temperature measurement.
9. Study and calibration of a rotometer for flow measurement.
10. Study and use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.
11. Study and calibration of Mcleod gauge for low pressure.

Note: Any 6 Experiments need to be performed out of 11 Experiments.

2014-15 **Code: 40336**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	1/-/-	4

PRODUCTION PLANNING AND CONTROL

Pre-requisite: Industrial Management.

Objective: The objective of this subject is to provide knowledge of Planing and control of Industry.

Codes/Tables: Nil

UNIT – I

Introduction : Definition – Objectives of production Planning and Control – Functions of production planning and control – Elements of production control – Types of production – Organization of production planning and control department – Internal organization of department.

UNIT – II

Forecasting – Importance of forecasting – Types of forecasting, their uses – General principles of forecasting – Forecasting techniques – qualitative methods and quantitive methods.

UNIT – III

Inventory management – Functions of inventories – relevant inventory costs – ABC analysis – VED analysis – EOQ model – Inventory control systems – P–Systems and Q-Systems, Introduction to MRP & ERP, LOB (Line of Balance), JIT inventory, and Japanese concepts.

UNIT – IV

Routing – Definition – Routing procedure –Route sheets – Bill of material – Factors affecting routing procedure. Schedule –definition – Difference with loading, Scheduling Policies – Techniques, Standard scheduling methods,

UNIT – V

Line Balancing, Aggregate planning, Chase planning, Expediting, controlling aspects.

Dispatching – Activities of dispatcher – Dispatching procedure – follow-up – definition – Reason for existence of functions – types of follow-up, applications of computer in production planning and control.

Outcome: Student should be able to understand the co-ordination between Production, Planning and control systems in manufacturing.

TEXT BOOKS:

1. Elements of Production Planning and Control / Samuel Eilon / Macmillan Publishers
2. Modern Production and operation managements / Baffa & Rakesh Sarin / John Wiley Publishers

REFERENCE BOOKS:

1. Operations Management / S.N. Chary/ TMH Publishers
2. Inventory Control Theory and Practice / Martin K. Starr and David W. Miller / Prentice-Hall Publishers
3. Reliability Engineering & Quality Engineering / Dr. C. Nadha Muni Reddy and Dr. K. Vijaya Kumar Reddy / Galgotia Publications, Pvt., Limited.
4. Production Control A Quantitative Approach / John E. Biegel/ Prentice-Hall
5. Production Control / Moore/ McGraw-Hill Publishers
6. Operations Management / Joseph Monks / McGraw-Hill Ryerson Publishers

2014-15 **Code: 403D1**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	1/-/-	4

ARTIFICIAL NEURAL NETWORKS
(ELECTIVE-IV)

UNIT-I

Introduction what is a neural network? Human Brain models of a Neuron, Neural Network viewed as directed Graphs, Network Architectures knowledge Representation, Artificial Intelligence and Neural Networks.

UNIT-II

Learning Process- Error Correction Learning, Memory based learning, Hebbain Learning, Competitive, Boltzmann Learning, Credit Assignment problem, Memory, Adaption, Statistical nature of the learning process.

UNIT-III

Single Layer perception- Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, learning rate annealing techniques perception- convergence theorem, Relation between perceptron and Bayes classifier for a Gaussian Environment.

Multilayer perceptron - Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, computer experiment future detection.

UNIT-IV

Back Propagation- Back Propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning techniques, Virtues and limitations of back propagation learning Accelerated convergence supervised learning.

Self organization Maps- Two basic features mapping models Self organization map, SOM Algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification.

UNIT-V

Neuro Dynamics- dynamical systems, Stability of equilibrium states, attractors neuro dynamical models, manipulation of attractors as a recurrent network paradigm.

Hopfield Models- Hopfield Models, computer experiment

TEXT BOOKS:

1. Neutral Network: A comprehensive foundation / Simon Hhaykan / PHI Publishers

REFERENCE BOOKS:

1. Artificial Neural networks / B.Vegnanarayana / Prentice Hall Publishers
2. Neural network in computer intelligence / Li Min Fu / TMH Publishers
3. Neural Networks / James A Freeman David M S Kapura / pearson education 2004
4. Introduction to Artificial Neural Systems / Jacek M. Zurada JAICO Publishing House Ed. 2006

2014-15 **Code: 403D2**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	1/-/-	4

TOTAL QUALITY MANAGEMENT
(ELECTIVE-IV)

UNIT - I

Quality, Total Quality, TQM: Introduction-Definition, Basic Approach, TQM framework, Historical Review, levels of quality, concept of personal quality, quality & profitability, measurement of quality, types of data, data concepts, Benefits of TQM.

UNIT - II

Evolution of TQM : Contribution of Quality Gurus- Edward Deming, 14 points, PDSA cycle, Joseph Juran, Quality trilogy, Crosby & quality treatment, Ishikawa and companywide quality control, Taguchi & his quality loss function.

UNIT - III

Leadership and quality costs : Characteristics of quality leaders, Quality statement, strategic planning, Introduction to quality costs, prevention costs, Appraisal costs, failure costs, Management of quality costs, economics total of quality costs and its reduction.

UNIT - IV

Tools and Techniques in TQM: Kaizen, Re-engineering, Six Sigma, Benchmarking Definition, Process of benchmarking, 5S, Poka-Yoke. Introduction to TPM – promotion, training, improvement needs, goals (OEE) **Quality Function**

UNIT - V

Deployment and Failure Modes Effects Analysis: Introduction to QFD and QFD process, Quality by design, Rationale for implementation of quality by design, FMEA, Design FMEA and process FMEA.

TEXT BOOKS:

1. Total Quality Management: Dale H. Bester field, Publisher - Pearson Education India, Edition 03/e Paperback (Special Indian Edition)
2. The Management & Control of Quality James R. Evans, William M. Lindsay Thomson –South Western, publications 6th Edn. 2004.
3. Quality management a process improvement approach – By Mark a Fryman, CENGAGE Publications India, Edn 2002.

REFERENCE BOOKS:

1. A New American TQM, four revolutions in management, Shoji Shiba, Alan Graham, David Walden, Productivity press, Oregon, 1990 F:\Final 8th sem Syllabus.doc
2. Organizational Excellence through TQM, H. Lal, New age pub, 2008

2014-15 **Code: 403D3**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	1/-/-	4

MAINTAINANCE AND SAFETY ENGINEERING
(ELECTIVE-IV)

UNIT-I

Introduction: Need for Maintenance, Facts and Figures, Modern Maintenance, Problem and Maintenance Strategy for the 21st century, Engineering Maintenance Objectives and Maintenance in Equipment Life Cycle, Terms and Definitions.

UNIT-II

Maintenance Management and Control: Maintenance Manual, Maintenance, Facility Evaluation, Functions of Effective Maintenance Management. Maintenance project control Methods, Maintenance Management Control Indices.

Types of Maintenance: Preventive maintenance elements of preventive, maintenance program, Establishing Preventive maintenance program PM Program Evaluation and improvement, PM Measures, PM Models, Corrective maintenance Corrective Corrective maintenance maintenance types Corrective maintenance steps and Downtime Components, Corrective maintenance measures Corrective maintenance models

UNIT- III

Inventory control in Maintenance: Inventory control Objectives and basic Inventory decision, ABC Inventory control method, Inventory Control Models Two-Bin inventory control and Safety Stock, Spares Determination factors Spares calculation Methods.

UNIT-IV

Quality and Safety in Maintenance: Needs for Quality Maintenance process, Maintenance work quality, Use of quality Control charts in Maintenance Work Sampling, post Maintenance Testing, Reasons of Safety problems in Maintenance, Guidelines to improve safety in Maintenance work, Safety Officer's Role in Maintenance Work, protection of Maintenance workers. Maintenance Costing: Reasons for Maintenance costing, Maintenance Budget preparation Methods and Steps, Maintenance Labor cost Estimation, Material cost Estimation, Equipment Life Cycle Maintenance Cost Estimation, Maintenance Cost Estimation Models.

UNIT-V

Reliability, Reliability controlled Maintenance, RCM: Goals and principles, RCM process and Associated Questions, RCM program Components Effectiveness Measurement Indicators. RCM Benefits and Reasons for its Failures. Reliability Versus Maintenance and Reliability in support Phase. Bathtub Hazard Rate Concept, Reliability Measures and Formulas Reliability Networks, Reliability analysis Techniques.

Maintainability: Maintainability Importance and Objective Maintainability in Systems Life Cycle, Maintainability Design Characteristics, Maintainability Functions and Measures, Common Maintainability Design Errors..

TEXT BOOKS:

1. Reliability: Maintenance and Safety Engineering / Dr. A.K.Guptha / Laxmi Publications.
2. Industrial Safety Management / L.M. Deshmukh / TMH Pulications

REFERENCE BOOKS:

1. Maintenance Engineering & Management / R.C.Mishra / PHI Publications
2. Reliability Engineering / Elsayed / Pearson Publishers
3. Engineering Maintenance a Modern Approach / B.S.Dhallon.2002 / C.R.R publishers

2014-15 **Code: 403D4**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	1/-/-	4

PLANT LAYOUT AND MATERIAL HANDLING
(ELECTIVE-IV)

Pre-requisite: Industrial Management and Automation in Manufacturing

Objective: The objective of this subject is to provide knowledge of Layout planning and different material handling equipments.

Outcome: The students shall be able to know different handling equipment in manufacturing industry at different stage.

Codes/Tables: Nil

UNIT-I

Introduction: Classification of Layout, Advantages and Limitations of different layout, Layout design procedures, Overview of the plant layout.

Process layout and product layout: Selection, specification Implementation and follow up, comparison of product and process layout.

UNIT-II

Heuristics for plant layout- ALDEP, CORELAP, CRAFT.

Group Layout, Fixed position layout. Quadratic assignment model Branch and Bound method.

UNIT-III

Introduction, Material Handling Systems. Material handling principles Classification of Material Handling Equipment, Relationship of Material Handling to plant layout.

UNIT-IV

Basic Material Handling Systems: Selection, Material Handling method path, Equipment, function oriented systems.

UNIT-V

Methods to minimize cost of material handling. Maintenance of Material handling Equipments , Safety in handling. Ergonomics of Material Handling equipment. Design, Miscellaneous equipments.

TEXT BOOKS:

1. Operation Management / PB Mahapatra / PHI Publications
2. Aspects of Material Handling/ DR. K C Arora & Shinde / Lakshmi Publications.

REFERENCE BOOKS:

1. Facility Layout and Location: An Analytical Approach / RL Francis / LF Mc Linnis jr and White / PHI Publications.
2. Production and Operation Management / R Pannerselvam / PHI Publications
3. Introduction to Material Handling / Ray and Sidhartha / New Age Publications.

2014-15 **Code: 403E1**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	-/-/-	4

RENEWABLE ENERGY SOURCES
(ELECTIVE - V)

Pre-requisite: Thermal Engineering

Objective: The objective of this subject is to provide knowledge about different alternative energy sources.

Codes/Tables: Nil

UNIT – I

Principles Of Solar Radiation : Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection: 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.

UNIT-III

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

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.

UNIT-IV

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.

UNIT-V

Direct Energy Conversion : Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joul Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

Outcome: The students shall be able know different types of energy sources which are available naturally.

TEXT BOOKS:

1. Renewable Energy Resources / Tiwari and Ghosal / Narosa Publishers
2. Non-Conventional Energy Sources / G.D. Rai / Khanna Publishers

REFERENCE BOOKS:

1. Renewable Energy Sources / Twidell & Weir / Taylor and Francis Group Publishers
2. Solar Energy / Sukhatme / TMH Publications
3. Solar Power Engineering / B.S Magal Frank Kreith & J.F Kreith / McGraw-Hill Publications
4. Principles of Solar Energy / Frank Krieth & John F Kreider / CRC Press Publications.
5. Non-Conventional Energy / Ashok V Desai / Wiley Eastern Publishers
6. Non-Conventional Energy Systems / K Mittal / Wheeler Publishers
7. Renewable Energy Technologies /Ramesh & Kumar / Narosa Publications

2014-15 **Code: 403E2**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	-/-/-	4

JET PROPULUSION AND ROCKET ENGINEERING
(ELECTIVE-V)

UNIT-I

Elements of Gas Turbine Theory- Thermo dynamic Cycles, open closed and semi-closed- parameters of performances- cycles modifications for improvement of performance.

UNIT-II

Jet Propulsion: Historical sketch reaction principle- essential features of propulsion devices- Thermal Engines, Classification of – Energy flow thrust, Thrust power and propulsion efficiency- Need for Thermal Jet Engines and applications

UNIT-III

Turboprop and Turbo Jet-I: Thermo dynamic cycles plant layout essential components principles of operation, Performance evaluation.

Turboprop and Turbo Jet-II: Thrust Augmentation and Thrust reversal Contrasting with piston Engine Propeller plant.

Ram Jet: Thermo dynamic cycle, plant lay-out essential components- principles of operation- performance evaluation- comparison among atmospheric thermal jet engines=- serqujet and pulse jet, elementary treatment.

UNIT-IV

Rocket Engines: Need for applications, - Basic principles of operation and parameters of performance- classification of solid and liquid propellant rocket engines advantages, domains of applications- propellants- comparison of propulsion systems

UNIT-V

Rocket Technology –I: Flight mechanics, Applications Thrust profiles, Acceleration – staging of rockets need for- Feed systems, injectors and expansion nozzles- Rocket heat transfer and ablative cooling.

Rocket Technology –II: Testing and instrumentation- Need for Cryogenics- Advanced propulsion Systems elementary treatment of Electrical Nuclear and plasma Arc Propulsion.

TEXTBOOKS:

1. Gas Turbines and Propulsive Systems / P.Khajuria & S.P.Dubey/ Dhanpatrai Publishers.
2. Gas Dynamics & Space Propulsion / M.C.Ramaswamy / Jaico Publishing House.

REFERENCE BOOKS:

1. Rocket Propulsion / Sutton / John Wiley & Sons Publishers
2. Gas Turbines / Cohen, Rogers & Sarvana Muttoo / Addision Wesley & Longman Publishers.
3. Gas Turbines / V. Ganesan / TMH Publishers

2014-15 **Code: 403E3**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	-/-/-	4

COMPUTATIONAL FLUID DYNAMICS
(ELECTIVE – IV)

UNIT-I

Elementary details in numerical Techniques: Number system and errors, Representation of integers, Fractions, Floating point Arithmetic, loss of significance and error propagation, condition and instability, computational methods for error estimation, Convergence of Sequences.

UNIT - II

Applied Numerical Methods: Solution of a system of simultaneous Linear Algebraic Equations, iterative schemes. of Matrix Inversion, Direct Methods for Matrix inversion, Direct Methods for banded matrices.

Finite Difference Applications in Heat conduction and Convention - Heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer.

UNIT - III

Finite Differences, discretization, consistency, stability, and Fundamentals of fluid flow modeling: Introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods.

UNIT - IV

Introduction to first order wave equation, stability of hyperbolic and elliptic equations, fundamentals of fluid flow modeling. conservative property, the upwind scheme.

Review of Equations Governing Fluid Flow and Heat Transfer: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navierstokes equations, conservation of energy principle, special forms of the Navier-stokes equations.

UNIT - V

Steady flow, dimensionless form of Momentum and Energy equations, Stokes equation, conservative body force fields, stream function - Vorticity formulation.

Finite Volume Method: Approximation of surface integrals, volume integrals, interpolation and differentiation practices, Upwind interpolation, Linear interpolation and Quadratic interpolation

TEXT BOOK:

1. Numerical Heat Transfer and Fluid Flow / Suhas V. Patankar / Butter-Worth Publications.
2. Computational Fluid Dynamics - Basics with applications / John. D. Anderson / Mc Graw Hill Publications.

REFERENCE BOOKS:

1. Computational Fluid Flow and Heat Transfer / Niyogi / Pearson Publications.
2. Fundamentals of Computational Fluid Dynamics / Tapan K. Sengupta / Universities Press.
3. Computational Fluid Dynamics / Jiyuan and Others / Elsevier Publications.

2014-15 **Code: 403E4**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
4	-/-/-	4

GAS DYNAMICS
(ELECTIVE – IV)

UNIT-I

Introduction: Concept of continuous and control volume. Continuity equation, momentum equation, streamlines, steady, one dimensional dynamic equation of a fluid flow with and without friction, energy equations.

Properties of atmosphere, standard atmosphere, relative pressure, use of air and gas tables, Condition for neglecting compressibility. Compressible flow, acoustic velocity. Mach number, Mach cone, Mach angle

UNIT-II

Isentropic flow: Stagnation enthalpy, density, pressure and temperature, local acoustic speed maximum speed, variation of Compressibility with Mach number.

Variable area flow, criteria for acceleration and deceleration, critical condition, nozzle discharge co-efficient, nozzle efficiency, operation of nozzles under varying backpressure.

UNIT-III

Flow in constant area duct: Adiabatic and isothermal- flow calculation of pressure, temperature, density, Mach number relationships. Limiting length of duct for adiabatic and isothermal flow. Fanno line.

Diabetic flow: Flow of perfect gases in constant area duct with heat exchange, density temperature, pressure and mach number relationships. Limiting conditions. Rayleigh line.

UNIT-IV

Wave phenomenon: pressure disturbances in compressible fluid, type of shock waves- normal, shock. Pressure-density-velocity-temperature and Mach number relations for a plane normal shock.

UNIT-V

Shock intensity- Rayleigh- pilot and prandtl- pitot equation for normal shock. Introduction to oblique shockwaves and hypersonic flow.

TEXT BOOKS:

1. Fundamentals of Compressible flow / S.M.Yahya / New Age International Publishers.
2. Gas dynamics through problem / Zoeb Hussain / Wiley Eastern Limited.

REFERENCE BOOKS:

1. Gas dynamics / E. Radha Krishnan / PHI Publications.
2. Gas dynamics / H.W. Lipman and A.Rashkhop, John Wiley Publishers.
3. Gas dynamics / Cambel and Jennings / McGraw Hill Publishers.

2014-15 **Code: 40337**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
-	-/-/-	2

INDUSTRY ORINETED MINI PROJECT

2014-15 **Code: 40338**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
-	-/6/-	2

SEMINAR

2014-15 **Code: 40339**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
-	-/15/-	0

PROJECT WORK

2014-15 **Code: 40340**

MALLA REDDY ENGINEERING COLLEGE
(*Autonomous)*

IV Year B.Tech. M.E. II-Sem

L	T/P/D	C
-	-/-/-	2

COMPREHENSIVE VIVA