



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.

Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

BACHELOR OF TECHNOLOGY MECHANICAL ENGINEERING

Course Structure and Syllabus

(Batches admitted from the academic year 2017 - 2018)

Note: The regulations hereunder are subject to amendments as may be made by the Academic Council of the College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates (including those already pursuing the program) as may be decided by the Academic Council.

PRELIMINARY DEFINITIONS AND NOMENCLATURES

- "Autonomous Institution /College" means an institution/college designated as autonomous institute/college by University Grants Commission (UGC), as per the UGC Autonomous College Statutes.
- "Academic Autonomy" means freedom to a College in all aspects of conducting its academic programs, granted by the University for promoting excellence.
- "Commission" means University Grants Commission.
- "AICTE" means All India Council for Technical Education.
- "University" the Jawaharlal Nehru Technological University, Hyderabad.
- "College" means Malla Reddy College of Engineering & Technology, Secunderabad unless indicated otherwise by the context.
- "Program" means:
 - Bachelor of Technology (B.Tech) degree program
 - UG Degree Program: B.Tech
- "Branch" means specialization in a program like B.Tech degree program in Electronics & Communication Engineering, B.Tech degree program in Computer Science and Engineering etc.
- "Course" or "Subject" means a theory or practical subject, identified by its course – number and course-title, which is normally studied in a semester.
- T–Tutorial, P–Practical, D–Drawing, L–Theory, C–Credits

FOREWORD

The autonomy is conferred on Malla Reddy College of Engineering & Technology (MRCET) by UGC based on its performance as well as future commitment and competency to impart quality education. It is a mark of its ability to function independently in accordance with the set norms of the monitoring bodies like UGC and AICTE. It reflects the confidence of the UGC in the autonomous institution to uphold and maintain standards it expects to deliver on its own behalf and thus awards degrees on behalf of the college. Thus, an autonomous institution is given the freedom to have its own curriculum, examination system and monitoring mechanism, independent of the affiliating University but under its observance.

Malla Reddy College of Engineering & Technology (MRCET) is proud to win the credence of all the above bodies monitoring the quality of education and has gladly accepted the responsibility of sustaining, and also improving upon the values and beliefs for which it has been striving for more than a decade in reaching its present standing in the arena of contemporary technical education. As a follow up, statutory bodies like Academic Council and Boards of Studies are constituted with the guidance of the Governing Body of the College and recommendations of the JNTU Hyderabad to frame the regulations, course structure and syllabi under autonomous status.

The autonomous regulations, course structure and syllabi have been prepared after prolonged and detailed interaction with several experts drawn from academics, industry and research, in accordance with the vision and mission of the college which reflects the mindset of the institution in order to produce quality engineering graduates to the society.

All the faculty, parents and students are requested to go through all the rules and regulations carefully. Any clarifications, if needed, are to be sought at appropriate time and with principal of the college, without presumptions, to avoid unwanted subsequent inconveniences and embarrassments. The Cooperation of all the stake holders is sought for the successful implementation of the autonomous system in the larger interests of the institution and brighter prospects of engineering graduates.

“A thought beyond the horizons of success committed for educational excellence”

PRINCIPAL



MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

Sponsored by CMR Educational Society

(Affiliated to JNTU, Hyderabad, Approved by AICTE - Accredited by NBA & NAAC – 'A' Grade - ISO 9001:2015 Certified)

Maisammaguda, Dhulapally (Post Via. Kompally), Secunderabad – 500100, Telangana State, India.

Contact Number: 040-23792146/64634237, E-Mail ID: mrcet2004@gmail.com, website: www.mrcet.ac.in

VISION

- ❖ To establish a pedestal for the integral innovation, team spirit, originality and competence in the students, expose them to face the global challenges and become technology leaders of Indian vision of modern society.

MISSION

- ❖ To become a model institution in the fields of Engineering, Technology and Management.
- ❖ To impart holistic education to the students to render them as industry ready engineers.
- ❖ To ensure synchronization of MRCET ideologies with challenging demands of International Pioneering Organizations.

QUALITY POLICY

- ❖ To implement best practices in Teaching and Learning process for both UG and PG courses meticulously.
- ❖ To provide state of art infrastructure and expert set to impart quality education.
- ❖ To groom the students to become intellectually creative and professionally competitive.
- ❖ To channelize the activities and tune them in heights of commitment and sincerity, the requisites to claim the never ending ladder of SUCCESS year after year.

For more information: www.mrcet.ac.in

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The Programme Educational Objectives of the programme offered by the department are broadly listed below:

| |
|--|
| <p>PEO1: PREPARATION To provide sound foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems.</p> |
| <p>PEO2: CORE COMPETANCE To provide thorough knowledge in Mechanical Engineering subjects including theoretical knowledge and practical training for preparing physical models pertaining to Thermodynamics, Hydraulics, Heat and Mass Transfer, Dynamicsof Machinery, Jet Propulsion, Automobile Engineering, Element Analysis, Production Technology, Mechatronics etc.</p> |
| <p>PEO3: INVENTION, INNOVATION AND CREATIVITY To make the students to design, experiment, analyze, interpret in the core field with the help of other inter disciplinary concepts wherever applicable.</p> |
| <p>PEO4: CAREER DEVELOPMENT To inculcate the habit of lifelong learning for career development through successful completion of advanced degrees, professional development courses, industrial training etc.</p> |
| <p>PEO5: PROFESSIONALISM To impart technical knowledge, ethical values for professional development of the student to solve complex problems and to work in multi-disciplinary ambience, whose solutions lead to significant societal benefits.</p> |

The Program Educational Objectives of the program offered by the department are articulated as follows.

| | |
|---|---|
| <p>PEO1: PREPARATION To provide sound foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems.</p> | <ul style="list-style-type: none"> • The basic requirement for any student to become a successful graduate is to have basic knowledge on fundamentals. • Therefore, the first and foremost the objective is defined as Preparation. |
| <p>PEO2: CORE COMPETANCE To provide thorough knowledge in Mechanical Engineering subjects including theoretical knowledge and practical training for preparing physical models pertaining to core field.</p> | <ul style="list-style-type: none"> • Providing services as per the Government & Industrial development plans and thrust areas. • Considering reports and projections of CII, ELIAP, AICTE, HRD etc., on industrial developments requirements. |
| <p>PEO3: INVENTION, INNOVATION AND CREATIVITY To make the students to design,</p> | <ul style="list-style-type: none"> • Preparing students to solve complex engineering problems, which require idea about inventing, innovation and |

Program Specific Outcomes (PSOs)

| | |
|-------------|---|
| PSO1 | Ability to analyze, design and develop Mechanical systems to solve the Engineering problems by integrating thermal, design and manufacturing domains. |
| PSO2 | Ability to succeed in competitive examinations or to pursue higher studies or research. |
| PSO3 | Ability to apply the learned Mechanical Engineering knowledge for the development of society and self. |

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

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

COURSE STRUCTURE**I Year B. Tech (MECH) – I Semester**

| S.NO | SUBJECT CODE | SUBJECT | L | T/P/D | C | MAX.MARKS | |
|--------------|--------------|---|-----------|-----------|-----------|------------|------------|
| | | | | | | Int | Ext |
| 1 | R17A0001 | English | 2 | - | 2 | 30 | 70 |
| 2 | R17A0021 | Mathematics-I | 4 | 1 | 4 | 30 | 70 |
| 3 | R17A0011 | Engineering Physics-I | 2 | 1 | 2 | 30 | 70 |
| 4 | R17A0014 | Environmental Studies | 3 | - | 3 | 30 | 70 |
| 5 | R17A0501 | Computer Programming With C | 3 | - | 3 | 30 | 70 |
| 6 | R17A0301 | Engineering Mechanics | 4 | 1 | 4 | 30 | 70 |
| 7 | R17A0581 | Computer Programming Lab | - | 3 | 2 | 25 | 50 |
| 8 | R17A0084 | IT Workshop/Engineering Workshop | - | 3 | 2 | 25 | 50 |
| 9 | R17A0081 | English Language Communication Skills Lab-I | - | 3 | 2 | 25 | 50 |
| *10 | R17A0003 | *Human Values and Societal Perspectives | 2 | - | - | 50 | - |
| TOTAL | | | 20 | 12 | 24 | 305 | 570 |

***Mandatory course: Non-credit subject, 50% of scoring is required for the award of the degree**

I Year B. Tech (MECH) – IISemester

| S.NO | SUBJECT CODE | SUBJECT | L | T/P/D | C | MAX.MARKS | |
|--------------|--------------|---|-----------|-----------|-----------|------------|------------|
| | | | | | | Int | Ext |
| 1 | R17A0002 | Professional English | 2 | - | 2 | 30 | 70 |
| 2 | R17A0022 | Mathematics-II | 4 | 1 | 4 | 30 | 70 |
| 3 | R17A0012 | Engineering Physics-II | 2 | 1 | 2 | 30 | 70 |
| 4 | R17A0013 | Engineering Chemistry | 3 | - | 3 | 30 | 70 |
| 5 | R17A0502 | Object Oriented Programming Through C++ | 3 | 1 | 3 | 30 | 70 |
| 6 | R17A0302 | Engineering Drawing | 4 | 3 | 4 | 30 | 70 |
| 7 | R17A0582 | Object Oriented Programming Through C++ Lab | - | 3 | 2 | 25 | 50 |
| 8 | R17A0083 | Engineering Physics/Engineering Chemistry Lab | - | 3 | 2 | 25 | 50 |
| 9 | R17A0082 | English Language Communication Skills Lab-II | - | 3 | 2 | 25 | 50 |
| TOTAL | | | 18 | 15 | 24 | 255 | 570 |

II Year B. Tech (ME) – I Semester (6 Core Subjects + 2Labs)

| S.NO. | SUBJECT CODE | SUBJECT | L | T/P/D | C | MAX MARKS | |
|--------------|--------------|--|-----------|-----------|-----------|------------|------------|
| | | | | | | Int | Ext |
| 1 | R17A0303 | Engineering Thermodynamics | 4 | 1 | 4 | 30 | 70 |
| 2 | R17A0304 | Material Science | 3 | - | 3 | 30 | 70 |
| 3 | R17A0206 | Electrical and Electronics Engineering | 3 | - | 3 | 30 | 70 |
| 4 | R17A0305 | Strength of Materials | 4 | 1 | 4 | 30 | 70 |
| 5 | R17A0306 | Kinematics of Machinery | 3 | - | 3 | 30 | 70 |
| 6 | R17A0310 | Machine Drawing | 3 | 1 | 3 | 30 | 70 |
| 7 | R17A0282 | Electrical and Electronics Engineering Lab | - | 3 | 2 | 25 | 50 |
| 8 | R17A0381 | Material Science and Strength of Materials Lab | - | 3 | 2 | 25 | 50 |
| *9 | R17A0006 | Gender Sensitization | - | 3 | - | 50 | - |
| Total | | | 20 | 12 | 24 | 280 | 520 |

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

II Year B. Tech (ME) – II Semester (5 Core Subjects + 1 Open Elective + 2Labs)

| S.NO. | SUBJECT CODE | SUBJECT | L | T/P/D | C | MAX MARKS | |
|--------------|----------------------|--|-----------|----------|-----------|------------|------------|
| | | | | | | Int | Ext |
| 1 | R17A0307 | Dynamics of Machinery | 4 | 1 | 4 | 30 | 70 |
| 2 | R17A0308 | Thermal Engineering | 4 | 1 | 4 | 30 | 70 |
| 3 | R17A0309 | Fluid Mechanics and Hydraulic Machinery | 3 | 1 | 3 | 30 | 70 |
| 4 | R17A0311 | Production Technology | 3 | - | 3 | 30 | 70 |
| 5 | R17A0061 | Managerial Economics and Financial Analysis | 3 | - | 3 | 30 | 70 |
| 6 | ***** | Open Elective- I | 3 | - | 3 | 30 | 70 |
| 7 | R17A0382 | Production Technology Lab | - | 3 | 2 | 25 | 50 |
| 8 | R17A0383 | Fluid Mechanics and Hydraulic Machinery | - | 3 | 2 | 25 | 50 |
| 9* | R17A0004 R17A0005 | Foreign Language:French (or) Foreign Language :German | 2 | - | | 50 | - |
| Total | | | 22 | 9 | 24 | 280 | 520 |

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

| II Year B. Tech (ME) – IISemester - Open Elective-I | | | | | |
|--|----------|------------------------------------|---|----------|------------------------------------|
| 1 | R17A0451 | Digital Electronics | 4 | R17A0351 | Elements of Mechanical Engineering |
| 2 | R17A0251 | Elements of Electrical Engineering | 5 | R17A0352 | Green Energy Systems |
| 3 | R17A0551 | Data Base Systems | 6 | R17A0051 | Intellectual Property Rights |

III Year B. Tech (ME) – I Semester (4 Core Subjects+1 Core Elective+1 Open Elective+2Labs)

| S.NO. | SUBJECT CODE | SUBJECT | L | T/P/D | C | MAX MARKS | |
|--------------|--------------|--|-----------|----------|-----------|------------|------------|
| | | | | | | Int | Ext |
| 1 | R17A0312 | Advanced Thermal Engineering | 4 | 1 | 4 | 30 | 70 |
| 2 | R17A0313 | Machine Design -I | 4 | 1 | 4 | 30 | 70 |
| 3 | R17A0314 | Machine Tools | 3 | - | 3 | 30 | 70 |
| 4 | R17A0315 | Metrology and Surface Engineering | 3 | - | 3 | 30 | 70 |
| 5 | ** | Core Elective -I | | - | | | |
| | R17A0316 | Computer Integrated Manufacturing | 3 | - | 3 | 30 | 70 |
| | R17A0317 | Innovation and Design Thinking | | | | | |
| | R17A0318 | Combustion Technology | | | | | |
| 6 | ***** | Open Elective -II | 3 | - | 3 | 30 | 70 |
| 7 | R17A0385 | Machine Tools and Metrology Lab | - | 3 | 2 | 25 | 50 |
| 8 | R17A0386 | Thermal Engineering Lab | - | 3 | 2 | 25 | 50 |
| Total | | | 20 | 8 | 24 | 230 | 520 |

III Year B. Tech (ME) –I Semester - Open Elective-II

| | | | | | |
|---|----------|---|---|----------|------------------------------------|
| 1 | R17A0452 | Industrial Electronics | 4 | R17A1251 | Introduction to scripting language |
| 2 | R17A0453 | Communication Networks | 5 | R17A1252 | Software Project Management |
| 3 | R17A0552 | Introduction to JAVA Programming | 6 | R17A0353 | Enterprise Resource Planning |

III Year B. Tech (ME) – II Semester (4 Core Subjects+1 Core Elective+1 Open Elective+2 Labs)

| S.NO. | SUBJECT CODE | SUBJECT | L | T/P/D | C | MAX MARKS | |
|--------------|--------------|---|-----------|----------|-----------|------------|------------|
| | | | | | | Int | Ext |
| 1 | R17A0319 | Machine Design -II | 4 | 1 | 4 | 30 | 70 |
| 2 | R17A0320 | Finite Element Methods | 3 | 1 | 3 | 30 | 70 |
| 3 | R17A0321 | Heat Transfer | 3 | 1 | 3 | 30 | 70 |
| 4 | R17A0322 | CAD/CAM | 4 | - | 4 | 30 | 70 |
| 5 | ** | Core Elective - II | 3 | - | 3 | 30 | 70 |
| | R17A0323 | Automobile Engineering | | | | | |
| | R17A0324 | Computational Fluid Dynamics | | | | | |
| | R17A0325 | Composite Materials | | | | | |
| 6 | ***** | Open Elective- III | 3 | - | 3 | 30 | 70 |
| 7 | R17A0387 | Heat Transfer Lab | - | 3 | 2 | 25 | 50 |
| 8 | R17A0388 | CAD/CAM Lab | - | 3 | 2 | 25 | 50 |
| 9* | R17A0007 | Technical Communication and Soft Skills | 2 | - | - | 50 | - |
| Total | | | 22 | 9 | 24 | 280 | 520 |

***Mandatory course: Non-credit course, 50% of scoring is required for the award of the degree**

| III Year B. Tech (ME) – IISemester - Open Elective-III | | | | | |
|--|----------|--------------------------------|---|----------|--------------------------|
| 1 | R17A0454 | Robotics and Automation | 4 | R17A0519 | Web Technologies |
| 2 | R17A1235 | Management Information Systems | 5 | R17A0354 | Nano Technology |
| 3 | R17A0553 | Data Structures using python | 6 | R17A0355 | Total Quality Management |
| 7 | R17A0554 | Python programming | | | |

IV Year B. Tech (ME) – I Semester (4 Core Subjects+2 Core Electives+2Labs)

| S.NO. | SUBJECT CODE | SUBJECT | L | T/P/D | C | MAX. MARKS | |
|--------------|--------------|---|-----------|----------|-----------|------------|------------|
| | | | | | | Int | Ext |
| 1 | R17A0326 | Power Plant Engineering | 4 | 1 | 4 | 30 | 70 |
| 2 | R17A0327 | Automation And Control Engineering | 3 | 1 | 3 | 30 | 70 |
| 3 | R17A0328 | Mechanical Measurements and Instrumentation | 3 | - | 3 | 30 | 70 |
| 4 | R17A0329 | Production and Operations Management | 4 | - | 4 | 30 | 70 |
| 5 | ** | Core Elective -III | 3 | - | 3 | 30 | 70 |
| | R17A0330 | Smart Manufacturing Technology | | | | | |
| | R17A0331 | Heating, Ventilation and Air Conditioning | | | | | |
| | R17A0332 | Product Design and Development | | | | | |
| 6 | ** | Core Elective- IV | 3 | - | 3 | 30 | 70 |
| | R17A0333 | Operations Research | | | | | |
| | R17A0334 | Mechanical Vibrations | | | | | |
| | R17A0335 | Hydraulics and Pneumatics | | | | | |
| 7 | R17A0389 | Automation and Control Engineering Lab | - | 3 | 2 | 25 | 50 |
| 8 | R17A0390 | Mechanical Measurements and Instrumentation Lab | - | 3 | 2 | 25 | 50 |
| Total | | | 20 | 8 | 24 | 230 | 520 |

IV Year B. Tech (ME) – II Semester (2 Core Electives + Project)

| S.NO. | SUBJECT CODE | SUBJECT | L | T/P/D | C | MAX. MARKS | |
|--------------|--------------|--|----------|-----------|-----------|------------|------------|
| | | | | | | Int | Ext |
| 1 | ** | Core Elective- V | 3 | 1 | 3 | 30 | 70 |
| | R17A0336 | Industrial Engineering and Management | | | | | |
| | R17A0337 | Maintenance and Safety Engineering | | | | | |
| | R17A0338 | Non-Destructive Testing | | | | | |
| 2 | ** | Core Elective -VI | 3 | 1 | 3 | 30 | 70 |
| | R17A0339 | Renewable Energy Sources | | | | | |
| | R17A0340 | Bio-Mass Engineering | | | | | |
| | R17A0341 | Energy Conservation and Management | | | | | |
| 3 | R17A0392 | Mini Project | - | - | 4 | - | 100 |
| 4 | R17A0393 | Technical Seminar | - | 6 | 2 | 50 | - |
| 5 | R17A0394 | Major Project | - | 15 | 12 | 100 | 200 |
| Total | | | 6 | 23 | 24 | 210 | 440 |

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. Tech MECH-I Sem

LT/P/D C

2 - / - / - 2

(R17A0001) ENGLISH**INTRODUCTION:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking, and 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/essay etc.

The text for non-detailed study 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:

- To provide amateur engineers with the critical faculties necessary in an academic environment, using the theoretical and practical components of English syllabus.
- To upgrade the capability of analyzing of texts from different periods and genres.
- To improve the language proficiency of the students in English with emphasis on LSRW skills to face complex engineering activities at workplace.
- To understand the basics of grammar to speak correct English and communicate effectively both formally and informally.
- To expose students to various techniques of reading skills which hone their comprehensive skills

SYLLABUS:**Listening Skills:****Objectives**

1. To enable students to develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.
 - Listening for general content
 - Listening to fill up information

- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.
 - Oral practice
 - Describing objects/situations/people
 - Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English: A Communicative Approach)
 - Just A Minute (JAM) Sessions.

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 the text
- 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
 - Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following text and course content, is prescribed for this semester. Textbook titled “Epitome of Wisdom”, published by Maruthi Publications, Hyderabad.

Unit – I

Chapter entitled ‘Mokshagundam Visvesvaraya’ from *Epitome of Wisdom*
and

Listening – Conversations – introducing each other, talking about a course

Speaking – Jam sessions

Reading – The Palm Islands

Writing – Writing Paragraphs

Grammar – Conjunctions and Adverbs

Vocabulary – Prefixes and Suffixes

Unit – II

Chapter entitled “Three Days to See” from *Epitome of Wisdom*
and

Listening – Conversations – planning for an outing

Speaking – Telephone Etiquettes

Reading – Physically challenged athletes

Writing – Memo writing

Grammar – Modal Auxiliaries

Vocabulary – Synonyms & antonyms

Unit – III

Chapter entitled “The Road Not Taken” from *A Selection of Robert Frost’s Poems (Owl Book)*, by Holt Paperbacks: 2 Revised Edition. 2002.

and

Listening – News items

Speaking – Public speaking

Reading – ‘If’ poem

Writing – Letter writing – formal/informal

Grammar – Knowing with questions (Wh – questions,) Question tags

Vocabulary – Similes and Metaphors

Unit – IV

Chapter entitled “The Last Leaf” from *Epitome of Wisdom*
and

Listening – Speech on environmental conservation

Speaking – Group discussion

Reading – Choose how to start your day

Writing – Writing a narrative

Grammar – Prepositions

Vocabulary – Idioms and one-word substitutes

Unit –V5. Chapter entitled “The Convocation Speech” from *Epitome of Wisdom*
and

Listening – Speech on ‘How do you make a teacher great’?

Speaking –Role plays

Reading – What is meant by entrepreneurship?

Writing – Essay writing

Grammar – Active voice and Passive voice

Vocabulary – Phrasal verbs

* Exercises apart from the text book shall also be used for classroom tasks.

REFERENCES:

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A Rama Krishna Rao, PSreehari, Published by Pearson.
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata McGraw– Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.

OUTCOMES:

- Acquire and apply the critical thought process effectively on complex engineering activities.
- Utilize the analytical capability to comprehend and design any text effortlessly.
- Imbibe the English proficiency to receive clear instructions, make notes and draft letters vividly.
- Identify the basic grammatical structures and its application accurately to communicate with society at large.
- Enhance their grammatical competency by spotting errors.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech MECH-I Sem

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

(R17A0021) MATHEMATICS – I

Course Objectives:

To learn

- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions if exist and concept of eigen values and eigen vectors of a matrix
- The mean value theorems and to understand the concepts geometrically, functions of several variables and optimization of these functions.
- Methods of solving the differential equations of first and higher order, Newton's law of cooling, Natural growth and decay, bending of beam etc.
- In many engineering fields the physical quantities involved are vector valued functions. Hence the vector calculus aims at basic properties of vector-valued functions and their application to line, surface and volume integrals.
- Solving differential equations using Laplace Transforms.

UNIT - I: Matrix Theory

Introduction to matrices- Rank of a matrix - Finding rank of a matrix by reducing to Echelon and Normal forms-Consistency of system of linear equations (homogeneous and non-homogeneous) using the rank of a matrix-Cayley - Hamilton Theorem (without proof) – Verification-finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem- Linear dependence and Independence of Vectors- Eigen values and eigen vectors of a matrix- Properties of eigen values and eigen vectors of real and complex matrices- Diagonalization of a matrix.

UNIT – II: Differential Calculus

Mean Value Theorems: Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value theorems with geometrical interpretations (all theorems without proof)- verification of the Theorems and testing the applicability of these theorems to the given function- Taylor's series -Maclaurin's series.

Functions of Several Variables: Jacobian-Functional dependence- Maxima and Minima of functions of two variables without constraints and with constraints - Method of Lagrange multipliers.

UNIT – III: Ordinary Differential Equations of First Order and Applications

Introduction to ordinary differential equation-Variable Separable form-Homogeneous-Non homogeneous- Exact-Non Exact-Linear and Bernoulli's equations-Applications of first order differential equations – Newton's Law of cooling- Law of natural growth and decay- Orthogonal trajectories.

UNIT - IV: Linear Differential Equations of Higher Order and Applications

Linear differential equations of second and higher order with constant coefficients- Non-homogeneous term of the type $f(x) = e^{ax}, \sin ax, \cos ax, x^n, e^{ax} V$ and $x^n V$ - Method of

variation of parameters-Applications to bending of beams, Electrical circuits and simple harmonic motion.

UNIT – V: Vector Calculus

Introduction- Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties - Laplacian operator, Line integral – work done – Surface integrals -Volume integral. Green’s Theorem,Stoke’s theorem and Gauss’s Divergence Theorems (Statement & their Verification).

TEXT BOOKS:

1. Mathematics – I, special Edition-MRCET, McGrahillPublishers,2017.
2. Engineering Mathematics – I by T.K.Vlyenger ,B.Krishna Gandhi and Others ,S Chand Publishers.

REFERENCES:

1. Engineering Mathematics by P. Siva ramakrishna Das, PearsonPublishers.
2. Advanced engineering Mathematics by Kreyszig, John Wiley & SonsPublishers.

Course Outcomes:

- After learning the contents the student is able to write the matrix representation of a set of linear equations and to analyze solutions of a system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equations. Also able to apply the theory of differential equations to the real world problems.
- The student will be able to evaluate multiple integrals (line, surface volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- Solve differential equations with initial conditions using Laplace Transform.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech MECH-I Sem

| | | |
|---|----------|---|
| L | T/P/D | C |
| 2 | - / 1/ - | 2 |

(R17A0011) ENGINEERING PHYSICS-I

Course Objectives:

- The information in optics is required for engineering technology students to understand wave nature of light for applying accurate measurements by means of optical instruments.
- From the study of quantum and statistical aspects dual behavior of electron and solid state physics can be realized by the engineering students.
- The basic information regarding electrons and holes and their functioning in semiconductors is evident to the students. The semiconductor devices provide basic information for the present communication system.
- To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
- To be able to distinguish ordinary light with a laser light and their applications in different fields.

UNIT-I

OPTICS:

Interference-Coherence-Coherent sources, Constructive and destructive interference. Theory of interference fringes (Expression for band width). Interference in thin films by Reflected light, Newton's rings Experiment. Diffraction-Types of diffraction, Difference Between interference and diffraction, Fraunhofer's diffraction (Single Slit), Diffraction Grating, Polarization, Types of polarization, Double Refraction, Nicol Prism.

UNIT-II

LASERS:

Characteristics of lasers, Spontaneous and Stimulated emissions, Einstein's Coefficients, Population inversion, Meta stable state, pumping, lasing action, Construction and Working of Ruby Laser, Helium-Neon Laser, Semi conductor lasers, Applications of lasers.

FIBER OPTICS:

Construction and Working Principle of an optical fiber, Advantages of optical fibers, Numerical aperture and Acceptance angle, Types of Optical fibers - Mode and Propagation Through step and graded index fibers, Optical Fiber Communication System, Attenuation, Applications of optical fibers.

UNIT-III

PRINCIPLES OF QUANTUM MECHANICS:

Wave nature and particle nature-de Broglie's Hypothesis, GP Thomson's Experiment, Davisson and Germer's experiment, Matter Waves, Heisenberg's uncertainty principle, Physical significance of wave function, Schrodinger time-independent wave equation, Particle in One dimensional infinite potential box.

UNIT-IV

ELEMENTS OF STATISTICAL MECHANICS & BAND THEORY OF SOLIDS:

Micro and Macro states, Maxwell Boltzmann, Bose Einstein, Fermi Dirac Statistical Distributions (Qualitative), Density of States, Fermi Energy, Introduction to electron theory of metals, Bloch Theorem (Qualitative), Kronig Penny model(Qualitative), EK curve (Brillouin Zone)-Effective mass of electron, Origin of energy bands in solids, Classification of solids Conductors, semi conductors and insulators.

UNIT-V**SEMICONDUCTOR PHYSICS:**

Types of semi conductors, Carrier concentration and Fermi level of intrinsic and Extrinsic Semiconductors, Hall Effect and applications, Direct and indirect band gap of Semiconductors.

SEMICONDUCTOR DEVICES:

Formation of PN junction diode, Energy level diagram of PN junction diode. V-I Characteristics of PN junction diode- PN junction diode as LED and Solar cell.

TEXT BOOKS:

1. Engineering Physics - S Mani Naidu- PearsonPublishers.
2. A Text Book of Engineering Physics- P.G. Kshirsagar, Avadhanulu –S.Chand

REFERENCES:

1. Solid State Physics, Kittel- WileyInternational.
2. Solid State Physics – AJ DekKer-MacmillanPublishers.
3. Engineering Physics, P.K. Palaniswamy, ScitechPublishers

COURSE OUTCOMES

- Analyze the various oscillations made by different oscillating bodies innature.
- Learntodesignadvice to get to maximum accuracy in measuring the dimensions optically.
- Get the knowledge of classification of materials which is used for various applications in material technology.
- Learn dielectric, magnetic properties of the materials and apply them in material technology.
- Learn the principles, production of LASER beam and application of LASER in various fields.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. MECH-I Sem

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

(R17A0014) ENVIRONMENTAL STUDIES

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations.
- Able to understand Green house effect, Global warming, Climate change and impacts on human environment.
- Understanding Environmental Protection act 1986, Air act 1981, Forest conservation act 1980.

UNIT-I:

Introduction: Definition of Environment and multidisciplinary nature of environmental sciences.

Ecosystems: Definition, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles (Carbon, Nitrogen, Water cycle) Bioaccumulation and Biomagnification with examples.

UNIT-II:

Natural Resources: Classification of Resources: water resources: types: surface and ground water and over utilization effects of ground water. Dams: benefits and problems. Forest resources: functions, causes and effects of Deforestation, Energy resources: renewable and non-renewable energy sources, use of alternate energy resources.

UNIT-III:

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional 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.

UNIT-IV:

Environmental Pollution and Control Technologies: **Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, sources, causes, effects and control measures **Water pollution:** Sources and types of pollution, causes and effects, water treatment methods. **Soil Pollution:** Sources and types, Impacts of modern agriculture. Solid waste management, e-Waste management.

Global Environmental Problems: Green house effect, Global warming, Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act 1986, Air act 1981, Forest conservation act 1980, Biomedical waste management and handling rules, International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol. EIA: EIA structure, methods of baseline data acquisition. Concepts of Environmental Management Plan (EMP).

Towards Sustainable Future: Concept, threats and strategies of Sustainable Development, Environmental Education.

TEXT BOOKS:

1. Environmental Studies by Anubha Kaushik, 4th Edition, New Age International Publishers.
2. Textbook of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
3. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHI Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley India Edition.
4. Principles of Environmental Science by William P. Cunningham & Mary Ann Cunningham Tata McGraw – Hill Publishing Company Ltd.
5. Environmental Studies by S. Rama Lakshmi & Purnima Smarath Kalyani Publishers.

Course Outcomes:

- Based on this course, the Engineering graduate will understand / evaluate / develop technologies on the basis of Ecological principles and environmental regulations which in turn helps in sustainable development
- Gain knowledge on natural resources available.
- Able to secure knowledge conservation of biodiversity: In-Situ and Ex-situ conservation.
- Understand the environmental pollution and control technologies.
- Learn concept, threats and strategies of sustainable development, environmental education.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech MECH-I Sem

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

(R17A0501) COMPUTER PROGRAMMING WITH C

Course Objectives

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the student to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods

UNIT-I

Introduction to Computing – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development Life Cycle, Algorithm, Flowchart. Introduction to C – History of C, Features Of C, Structure Of C Program, Character Set, C Tokens-keywords, Identifiers, Constants, Data types, Variables, Operators, Expressions, Precedence and Associativity, Expression Evaluation, Type conversion, Statements- Selection Statements(Decision Making) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, other statements related to looping – break, continue, goto.

UNIT-II

Functions-Designing Structured Programs, Types of Functions- user defined functions, Standard Functions, Inter function communication, Categories of functions ,Parameter Passing techniques, Scope, Storage classes-auto, register, static, extern, Type qualifiers, Recursion- recursive functions, Preprocessor commands.

UNIT-III

Arrays – Declaration and Initialization, Arrays with functions , Array Applications, Two dimensional arrays, Multi dimensional arrays.

Strings – Declaration and Initialization, String Input / Output functions, Arrays of strings, String manipulation functions.

UNIT-IV

Pointers- Introduction, Definition and uses of pointers, address operator, Pointer variables, Pointer constants , void pointers, Pointer arithmetic, Pointers to Pointers, Pointers with Arrays, Pointers with Functions, Pointers to functions, Array of pointers, Pointers with Strings. Dynamic Memory Management functions: malloc(), calloc(), realloc() and free()

UNIT-V

Structures and Unions - Introduction, Declaration and Initialization, Structure within a structure, Operations on structures, Array of Structures, Pointer to Structures, Structures with Functions, Self referential structures, Typedef, enum, bitfields, Unions.

Files – Concept of a file, Streams, Text files and Binary files, Opening and Closing files, File input / output functions, File Status functions (Error handling), Positioning functions, Command line arguments.

TEXT BOOKS:

1. Computer Programming with C special Edition. MRCET, Tata Mc Graw Hill Publishers.
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

REFERENCE BOOKS:

1. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
2. Computer Programming, E.Balagurusamy, First Edition, TMH.
3. C and Data structures – P. Padmanabham, Third Edition, B.S.Publications.
4. Programming in C, Ashok Kamthane. Pearson Education India.
5. Letus C, Yashwanth Kanethkar, 13th Edition, BPB Publications.

Course Outcomes:

- Acquire knowledge about the basic concept of writing a program.
- Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Learn how to use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Understand the Role of Functions involving the idea of modularity.
- Understand the Concept of Array and pointers dealing with memory management.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B.Tech MECH-ISEM

L T/P/DC

4 1/-/- 4

(R17A0301) ENGINEERING MECHANICS**Course Objectives:**

- Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
- In depth understanding of specialist bodies of knowledge within the engineering discipline.
- Application of established engineering methods to complex engineering problem solving.
- Application of systematic engineering synthesis and design processes.

Unit – I

Introduction to Engineering Mechanics – Basic Concepts. **Resultants of Force System:** Parallelogram law – Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force - principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Unit – II

Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems - Equilibrium of Spatial Systems.

FRICTION: Introduction – Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions – Motion of Bodies: Wedge, Screw, Screw-jack, and Differential Screw-jack.

Unit – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Unit – IV

Moments of Inertia: Definition – Polar Moment of Inertia – Radius of gyration - Transfer formula for moment of inertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - mass moment of inertia of composite bodies.

Unit – V

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular components of curvilinear motion – Kinematics of Rigid Body - Types of rigid body motion - Angular motion - Fixed Axis Rotation

Kinetics of particles: Translation - Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations of plane motion - Angular motion - Fixed Axis Rotation – Rolling Bodies.

TEXT BOOKS:

1. Engineering Mechanics / S. Timoshenko and D. H. Young, McGraw Hill Book Company.
2. Engineering Mechanics - Statics and Dynamics by Vijaya Kumar Reddy K, Suresh Kumar J. B. Publications
3. Engineering Mechanics / S.S. Bhavikati & K.G. Rajasekharappa

REFERENCES:

1. A text of Engineering Mechanics / Y.V.D. Rao / K. Govinda Rajulu / M. Manzoor Hussain, Academic Publishing Company
2. Engg. Mechanics / M.V. Seshagiri Rao & D. Rama Durgaiah / Universities Press
3. Engineering Mechanics, Umesh Regl / Tayal.
4. Engineering Mechanics / K.L. Kumar / Tata McGraw Hill.
5. Engineering Mechanics / Irving Shames / Prentice Hall

Course Outcomes:

- Gain the knowledge on the concepts of force, moment and its application.
- Understand and apply the knowledge on drawing free body diagrams and solve the problems using analytical methods and law of triangle of forces.
- Students are capable of finding centroid, center of gravity, moment of inertia and polar moment of inertia including transfer methods and their applications.
- Understanding the motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.
- Understand and apply the knowledge on concepts of D'Alembert's principle and particle motion

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech MECH-I Sem

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

(R17A0581) COMPUTER PROGRAMMING LAB

Course Objectives:

- Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming
- Acquire knowledge about the basic concept of writing a program.
- Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
- Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- Role of Functions involving the idea of modularity.
- Concept of Array and pointers dealing with memory management.
- Structures and unions through which derived data types can be formed
- File Handling for permanent storage of data or record.
- Programming using gcc compiler in Linux.

Week 1:

- a) Write a C program to find sum and average of three numbers.
- b) Write a C program to find the sum of individual digits of a given positive integer.
- c) Write a C program to generate the first n terms of the Fibonacci sequence.

Week 2:

- a) Write a C program to generate prime numbers between 1 to n.
- b) Write a C program to check whether given number is Armstrong Number or Not.
- c) Write a C program to evaluate algebraic expression $(ax+b)/(ax-b)$.

Week 3:

- a) Write a C program to check whether given number is perfect number or Not.
- b) Write a C program to check whether given number is strong number or not.

Week 4:

- a) Write a C program to find the roots of a quadratic equation.
- b) Write a C program to perform arithmetic operations using switch statement.

Week 5:

- a) Write a C program to find factorial of a given integer using non-recursive function.
- b) Write a C program to find factorial of a given integer using recursive function.

Week 6:

- a) Write a C program to find GCD of two integers by using recursive function.
- b) Write a C program to find GCD of two integers using non-recursive function.

Week 7:

- a) Write a C program to find both the largest and smallest number in a list of integers.
- b) Write a C Program to Sort the Array in an Ascending Order
- c) Write a C Program to find whether given matrix is symmetric or not.

Week 8:

Revision of programs

Week 9:

- a) Write a C program to perform addition of two matrices.
- b) Write a C program that uses functions to perform Multiplication of Two Matrices.

Week 10:

- a) Write a C program to use function to insert a sub-string into given main string from a given position.
- b) Write a C program that uses functions to delete n Characters from a given position in a given string.

Week 11:

- a) Write a C program using user defined functions to determine whether the given string is palindrome or not.
- b) Write a C program that displays the position or index in the main string S where the sub string T begins, or - 1 if S doesn't contain T.

Week 12:

- a) Write C program to count the number of lines, words and characters in a given text.
- b) Write a C program to find the length of the string using Pointer.

Week 13:

- a) Write a C program to Display array elements using calloc() function.
- b) Write a C Program to Calculate Total and Percentage marks of a student using structure.

Week 14:

- a) Write a C program that uses functions and structures 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
- b) Write a C program to display the contents of a file.

Week 15:

- a) Write a C program to copy the contents of one file to another.
- b) Write a C program to merge two files into a third file.
- c) Write a C program to reverse the first n characters in a file.

Week 16:

Revision Of Programs

TEXT BOOKS

1. C Programming and Data Structures, P.Padmanabham, Third Edition, BSPublications
2. Computer programming in C.V.RAjaraman, PHIPublishers.
3. C Programming, E.Balagurusamy, 3rdedition, TMHPublishers.
4. C Programming, M.V.S.S.NVenkateswarlu and E.V.Prasad,S.ChandPublishers
5. Mastering C,K.R.Venugopal and S.R.Prasad, TMHPublishers.

Course Outcomes:

- Acquire knowledge about the basic concept of writing aprogram.
- Understand the Role of constants, variables, identifiers, operators, type conversion and other building blocks of CLanguage.
- Learn how to use of conditional expressions and looping statements to solve problems associated with conditions andrepetitions.
- Understand the Role of Functions involving the idea ofmodularity.
- UnderstandtheConcept ofArrayandpointersdealingwithmemorymanagement.
- Learn Structures and unions through which derived data types can beformed
- Learn File Handling for permanent storage of data orrecord.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. Tech MECH-I Sem

L T/P/D C
/3/- 2**(R17A0084) IT WORKSHOP LAB / ENGINEERING WORKSHOP****Course Objectives:**

- Able to know the knowledge for computer assembling and software installation that meets the specified needs of office considerations.
- Student able to know how to solve the troubleshooting problems in designing IT tools or any other component related to software.
- Student able to understand preparation of PPT, Documentation and budget sheet etc. so that the students cope with any kind of complex activities in their engineering work set.
- Student able to learn about different tools used in the lab.
- Student able to learn about foundry, welding, plumbing, house wiring and Tinsmithy operations.

PC HARDWARE**Week 1:**

Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral

Week 2:

- i. Every student should individually install MS windows on the personal computer.
- ii. Basic DOS Commands

Week 3:

- a) Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals
- b) Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.

INTERNET & WEB BROWSERS**Week 4:**

Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers And How to access the websites and email & Search Engines & various threats on the internet and would be asked to configure their computer to be safe on the internet, Antivirus downloads to avoid viruses and/or worms.

MS OFFICE

Week 5:

- a) Word Orientation: an overview of Microsoft (MS) office 2007/ 10: Importance of MS office 2007/10, overview of toolbars, saving files, Using help and resources, rulers, format painter. Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge inword.
- b) Using Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word &Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, TrackChanges.

ENGINEERING WORKSHOP

1. TRADES FOREXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. BlackSmithy
5. House-wiring

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. MachineShop
3. Welding
4. Foundry
5. Metal Cutting (WaterPlasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/SixthEdition.

Course Outcomes:

- Apply knowledge for computer assembling and software installation that meets the specified needs of office considerations.
- Ability to solve the trouble shooting problems in designing IT tools or any other component related to software.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc. so that the students cope with any kind of complex activities in their engineering work setup.
- Students can understand different machine shop operations
- Students can understand Foundry, welding, plumbing, house wiring and Tin smithy operation and learned about metal cutting processes.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. Tech MECH-I Sem

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

(R17A0081) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

Course Objectives:

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation, ample speaking opportunities are provided.
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussions and public speaking

Syllabus: English Language Communication Skills Lab has two parts:

- a. Computer Assisted Language Learning (CALL) Lab
- b. Interactive Communication Skills (ICS) Lab

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

UNIT –I

CALL Lab: Introduction to Phonetics –Speech Sounds –Vowels and Consonant Transcriptions

ICS Lab: Ice-Breaking activity - JAM session

UNIT –II

CALL Lab: Pronunciation: Past Tense Markers and Plural Markers, Mispronounced sounds, Silent letters

ICS Lab: Situational Dialogues/Role Plays – Informal

UNIT -III

CALL Lab: Syllable and Syllabification

ICS Lab: Situational Dialogues/Role Plays – Formal

WORKSHEETS FOR LETTER WRITING

ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 60 students with 60 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 –2.8GHZ
 - b) RAM –512 MB Minimum
 - c) HardDisk –80GB
- ii) Headphones of High quality

2. Interactive Communication Skills (ICS) 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.

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 University 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 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 with the help of another member of the staff of the same department of the other institution.

Course Outcomes:

- Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering setup.
- Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
- Accuracy in pronunciation and restoring Standard English thereby crafting better command in English languages so that the students have a cutting edge over others in society.
- Imbibing appropriate use of language in situations to work as an individual and as a leader in diverse teams
- Understand the Concept of Array and pointers dealing with memory management.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. Tech MECH-I Sem

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

(R17A0003) HUMAN VALUES AND SOCIETAL PERSPECTIVES (MANDATORY COURSE)

Course Objective: This introductory course input is intended

- To help the students appreciate the essential complementarity between 'VALUES' and skills' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective form the basis of value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.
- To learn trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature
- To facilitate Such a holistic perspective forms the basis of value based living in a natural way.

Unit-I

Course Introduction–Need, Basic Guidelines, Content and Process of Value Education:

Understanding the need, basic guidelines, content and process for value Education. Animal consciousness vs Human consciousness, Self Exploration -What is it? Its content and process; Continuous Happiness and Prosperity-A look at basic Human Aspirations. Right understanding, Relationship and physical Facilities –the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and prosperity correctly –A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Unit-II

Understand Harmony in the Human Being –Harmony in Myself: Understanding human being as a co-existence of the sentient 'I' and the material 'Body', understanding the needs of self ('I') and 'Body'-Sukh and Suvidha. Understanding the body as an instrument of 'I' (I being the does, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' . Understanding the harmony of I with the Body: Sanyam and Swasthya: correct appraisal of physical needs, meaning of prosperity in detail. Programs to ensure Sanyam and Swasthya.

Unit-III

Understanding Harmony in the Family and Society-Harmony in Human-Human Relationship: Understanding harmony in the Family –the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti: Trust (Vishwas) and Respect

(Samman) as the foundational values of relationship. Understanding the meaning of Vishwas: Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society –Undivided society (AkhandSamaj), Universal Order (SarvabhaumVyawastha) –from family to worldfamily!

Unit-IV

Understanding Harmony in the Nature and Existence –Whole existence as Co-existence: Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature, Recyclability and Self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all –pervasive space. Holistic perception of harmony at all levels of existence.

Unit-V

Implications of the above Holistic Understanding of Harmony on Societal Perspectives: Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis of Humanistic Education, Humanistic Constitution and Humanistic Universal Order.

TEXT BOOKS

1. R R Gaur, R Sangal, G P BAgaria, 2009 A Foundation Course in Human Values and Professional Ethics.
2. Prof.KVSubba Raju, 2013, Success secrets for Engineering students , Smart student Publications, 3rd Edition.

REFERENCE BOOKS

1. Ivan Illich, 1974, Energy & Equity, The Trinity press, Worcester and Harper Collins, USA.
2. E.F. Schumacher, 1973, small is Beautiful: a study of economics as if people mattered, Blond, Briggs, & Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya path Sansathan Amarkantak.
4. Susan George, 1976, How the other Half Dies, Penguin press Reprinted 1986, 1991
5. PL Dhar, RR Gaur, 1990 Science and Humanism Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William A. Behrens III, 1972, Limits to Growth – Club of Rome's report Universe Books.
9. E.G Seebauer & Robert L. Beery, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajran , S Natrajan & V.S Senthil kuma, Engineering Ethics (including Human Values), Eastern Economy Edition, prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & other Literature:

1. Value Education website <http://www.uptu.ac.in>
2. Story of stuff, <http://www.storyofstuff.com>

3. Al Gore, An Inconvenient Truth, Paramount classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology - the Untold Story

COURSE OUTCOMES

- The students will be able to obtain happiness and prosperity in their life.
- They will develop harmony at all levels.
- They can have satisfying human behaviour throughout their life.
- They will learn trustful and mutually satisfying human behaviour.
- Students will be able to know holistic perspective for the basis of value based living in a natural way.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. Tech MECH-IISEM

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

(R17A0002) PROFESSIONAL ENGLISH

INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking, and 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/essay etc.

The text for non-detailed study 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.

Course Objectives:

- Provide amateur engineers with the critical faculties necessary in an academic environment, using the theoretical and practical components of English syllabus.
- Upgrade the capability of analyzing of texts from different periods and genres.
- Improve the language proficiency of the students in English with emphasis on LSRW skills to face complex engineering activities at workplace.
- Understand the basics of grammar to speak correct English and communicate effectively both formally and informally.
- To foster sentence-level and holistic understanding of the context through active listening.

SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions. Students should be given practice in listening to the sounds of the language to be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.
 - Listening for general content
 - Listening to fill up information

- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.
 - Oral practice
 - Describing objects/situations/people
 - Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: Learning English: A Communicative Approach)
 - Just A Minute (JAM) Sessions.

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 the text
- 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
 - Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following text and course content is prescribed.

Text book entitled “Skills Annexe: Functional English for Success”, published by Orient Black Swan, Hyderabad.

UNIT-I

Chapter entitled “Of parents and children” from “*The essays of Francis Bacon*”, paperback-Import, 11 Oct 2008.

and

Listening – Listening for the theme and gist

Speaking – Describing situations and objects

Reading – Why pure science in India lags behind? – By P Rajendran

Writing – Note-taking and Note-making

Grammar – Nouns and Articles

Vocabulary – Homonyms, Homographs, Homophones

Unit –II

Chapter entitled “Sachin Tendulkar” from *Skills Annexe -Functional English for Success*,

and

Listening – listening for opinions

Speaking – Project Oral Presentations

Reading – Benefits of physical activity

Writing – Report writing

Grammar – Common Errors

Vocabulary –Technical Vocabulary

Unit –III

Job applications: Cover letter & Curriculum vitae

and

Listening – listening for main and sub-points

Speaking – Giving directions and instructions

Reading – Editorial letters from newspapers

Writing – Formal letter writing

Grammar – Tenses

Vocabulary – Collocations

Unit – IV

Chapter entitled “Human Values and Professional Ethics” from *Skills Annexe -Functional English for Success*

and

Listening – Listening for details

Speaking – Talking about hypothetical situations

Reading – What I Cherish Most

Writing – E-mail writing

Grammar – Types of verbs: Transitive, Intransitive, Ergative, finite and non – finite

Vocabulary – Commonly confused words

Unit – V

Chapter entitled “The fringe benefits of failure and the importance of imagination” a speech by J.K. Rowlings

and

Listening – listening for information

Speaking – Oral Presentations

Reading – The one thing every business executive must understand about social media

Writing –Picture composition

Grammar – Concord

Vocabulary –Commonly misspelt Words

* Exercises apart from the text book shall also be used for classroom tasks.

REFERENCES:

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A Rama Krishna Rao, PSreehari, Published by Pearson.
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata McGraw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press
9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuolcuri Mario, Cambridge University Press.

Course Outcomes:

- Acquire and apply the critical thought process effectively on complex engineering activities.
- Utilize the analytical capability to comprehend and design any text effortlessly.
- Imbibe the English proficiency to receive clear instructions, make notes and draft letters vividly.
- Identify the basic grammatical structures and its application accurately to communicate with society at large.
- Use polite expressions in all formal situations.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B.Tech MECH-IISEM

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

(R17A0022) MATHEMATICS – II

Course Objectives

- The objective of interpolation is to find an unknown function which approximates the given data points and the objective of curve fitting is to find the relation between the variables x and y from given data and such relationships which exactly pass through the data (or) approximately satisfy the data under the condition of sum of least squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data and also used to find the roots of an equation and to solve differential equations.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very required. Indeed, any periodic and non periodic function can be best analyzed in one way by Fourier series method.
- PDE aims at forming a function with many variables and also their solution methods. Method of separation of variables technique is learnt to solve typical second order PDE.
- Properties of Laplace Transform, Inverse Laplace Transform and Convolution theorem

UNIT – I: Solution of Algebraic, Transcendental Equations and Interpolation

Solution of Algebraic and Transcendental Equations: Introduction – Graphical interpretation of solution of equations. The Bisection Method – Regula-Falsi Method – The Iteration Method – Newton-Raphson Method.

Interpolation: Introduction-Errors in polynomial interpolation-Finite differences- Forward Differences- Backward differences – Central differences – Symbolic relations and separation of symbols-Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae – Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

UNIT – II: Numerical techniques

Numerical integration: Generalized Quadrature-Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ Rule.

Numerical solution of Ordinary Differential equations: Solution by Taylor's series method – Picard's Method of successive Approximation- single step methods-Euler's Method-Euler's modified method, Runge-Kutta Methods.

Curve fitting: Fitting a straight line – Second degree curve-exponential curve-power curve by method of least squares.

UNIT – III: Fourier series

Definition of periodic function. Fourier expansion of periodic functions in a given interval of length 2π . Determination of Fourier coefficients – Fourier series of even and odd functions – Half-range Fourier sine and cosine expansions-Fourier series in an arbitrary interval.

UNIT-IV: Partial differential equations

Introduction -Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and non-linear equations(Charpit's method),Method of separation of variables for second order equations and Applications of PDE to one dimensional (Heat equation).

UNIT – V Laplace Transforms and Applications

Definition of Laplace transform- Domain of the function and Kernel for the Laplace transforms- Existence of Laplace transform- Laplace transform of standard functions- first shifting Theorem,-Laplace transform of functions when they are multiplied or divided by "t"- Laplace transforms of derivatives and integrals of functions – Unit step function – second shifting theorem – Dirac's delta function- Periodic function – Inverse Laplace transform by Partial fractions-Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions- Convolution theorem –Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Mathematics-II , Special Edition- MRCET, Mc Graw Hill Publishers, 2017.
2. Mathematical Methods by T.K.Viyenger ,B.Krishna Gandhi and Others ,SChand.

REFERENCES:

1. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt.Ltd.
2. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.

Course Outcomes:

- From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, one can find the most appropriate formula for a guesses relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making.
- The student will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation. Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series.
- One will be able to find a corresponding Partial Differential Equation for an unknown function with many independent variables and to find their solution.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B.Tech MECH-IISEM

| | | |
|---|-------|---|
| L | T/P/D | C |
| 2 | -/1/- | 2 |

(R17A0012) ENGINEERING PHYSICS-II

Course Objectives:

- To understand the basics of bonding in solids, crystal structures and characterization techniques.
- To make the students aware of X-ray diffraction and different techniques of it.
- To understand the behavior of dielectric materials, magnetic materials and nano materials.
- To understand dielectric and magnetic properties of the materials and enable them to design and apply in different fields.
- To be able to distinguish ordinary light with a laser light and their applications in different fields.

UNIT-I

BONDING IN SOLIDS:

Types of bonds - Primary, Secondary, Forces between atoms, Expression for cohesive energy between two atoms.

CRYSTALLOGRAPHY:

Space lattice, Basis, Unit cell, lattice parameters, Crystal systems, Bravais lattices, Atomic number, coordination number, packing factor of SC, BCC, FCC crystals, Crystal planes and directions - Miller indices. Expression for inter planar distance in cubic crystal, Structure of NaCl and Diamond.

UNIT- II

X-RAY DIFFRACTION:

Bragg's law, Experimental techniques - Laue's method, powder method, Applications of x-ray diffraction.

DEFECTS IN CRYSTALS:

Classification of crystal defects, Point defects - Vacancies & Interstitials, Concentrations of Schottky and Frenkel defects, Line defects - edge dislocation and screw dislocation, Burger's vector.

UNIT-III

DIELECTRIC PROPERTIES:

Electric dipole, Dipole moment, Polarization vector (P), Displacement vector (D), Dielectric constant (K), Electric susceptibility (χ), Types of polarizations - Expression for Electronic and Ionic polarization, Internal fields in dielectrics, Clausius-Mosotti relation, Piezo electricity and Ferro electricity, Applications of dielectric materials.

UNIT-IV

MAGNETIC PROPERTIES:

Magnetic permeability, Field intensity, Magnetic field induction, Magnetization, Magnetic susceptibility, Origin of Magnetic moment - Bohr magneton, Classification of magnetic materials - Dia, Para and Ferro, Ferri and Anti ferro magnetic materials,

Explanation of Hysteresis loop on the basis of domain theory of ferromagnetism. Soft and hard magnetic materials.

SUPER CONDUCTIVITY:

Super conductivity, Properties of super conductors, Meissner effect, Types –I Type-II super conductors, Applications of super conductors.

UNIT-V**NANO SCIENCE & NANO TECHNOLOGY:**

Nano scale, Types of Nano materials, Surface to volume ratio and Quantum confinement, Bottom up Fabrication- Sol gel ,Top down Fabrication- Physical Vapour Deposition, Characterisation of Nano particles –TEM and SEM, Applications of Nano materials.

TEXTBOOKS:

1. Engineering Physics - S Mani Naidu- PearsonPublishers.
2. A Text Book of Engineering Physics- P.G. Kshirsagar, Avadhanulu –S.Chand

REFERENCES:

1. Solid State Physics, Kittel- WileyInternational.
2. Solid State Physics – AJ DekKer-MacmillanPublishers.
3. Engineering Physics, P.K. Palaniswamy, ScitechPublishers

Course Outcomes:

- The students would be able to learn the fundamental concepts on behavior of crystalline solids.
- The student will be able to think about the applications of dielectric, magnetic and nano materials.
- Finally Engineering physics course helps the student to develop problem solving skills and analytical skills.
- Learn dielectric, magnetic properties of the materials and apply them in material technology.
- Learn the principles, production of LASER beam and application of LASER in various fields.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech MECH-II Sem

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

(R17A0013) ENGINEERING CHEMISTRY

Course Objectives

- To impart the basic concepts and ideas in chemistry, to develop scientific attitudes and enable the students to correlate the concepts of chemistry with the core programmes.
- Electrochemistry unit give conceptual knowledge about spontaneous processes and how can they be harnessed for producing electrical energy and efficiency of systems. Fuel cells which are the alternate energy sources for generating electrical energy on spot and portable applications.
- 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.
- To impart the knowledge of organic reaction mechanisms which are useful for understanding the synthesis of organic compounds.
- To analyze different types of fuels and their applications in various engineering fields.

UNIT I: Electrochemistry:

Conductance - Specific, Equivalent, Molar conductance and their unit, Applications of Conductance-Conductometric titrations (Acid base and Precipitation titrations); EMF-electrode and electrode potentials; Nernst equation and its applications; Electrochemical cells-Galvanic cell (Daniel cell) and Concentration cell (electrolytic concentration cell); Types of Electrodes—(construction and functioning of Calomel, Quinhydrone and Glass electrodes); determination of P^H using glass electrode; Potentiometric titrations (Acid Base and Redox titrations); electrochemical series and its applications; Numerical problems on conductance. **Batteries:** Primary (Lithium cells) and Secondary cells (Lead-Acid cell and Ni-Cd cell); **Fuel cells** - Hydrogen -Oxygen fuel cell and Methanol-Oxygen fuel cell - construction, functioning, advantages and applications.

Unit II: Corrosion and its Control:

Causes and effects of corrosion; Theories of corrosion – Chemical corrosion (oxidation corrosion) & Electrochemical corrosion (mechanism of evolution of Hydrogen and Absorption of oxygen); Galvanic corrosion; Factors affecting rate of corrosion – Nature of metal (position of metal in galvanic series, overvoltage, relative areas of anodic and cathodic parts, purity of metal and passivity) and Nature of environment (temperature, humidity and pH effect)

Corrosion control methods: Cathodic protection (Sacrificial Anodic and Impressed Current Cathodic protection). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), cladding, electroplating (Cu plating) and Electroless plating (Ni plating) – advantages and applications of electroplating/electroless plating.

UNIT- III: Engineering Materials Polymers:

Classification of Polymers, Types of Polymerization (Chain growth, Step growth & Zeigler Natta) **Plastics:** Thermoplastic & Thermosetting resins, Preparation, properties, engineering

applications of PVC, Teflon and Bakelite. **Fibers**- Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers**–Natural rubber and its vulcanization; **Elastomers**–Buna-S and Butyl rubber; **Conducting polymers**: Polyacetylene-Mechanism of conduction, doping; applications of conducting polymers; **Bio-degradable Polymers**: preparation and applications of Poly vinylacetate and Poly lactic acid.

Lubricants: Characteristics of a good lubricant; Classification with examples; properties of lubricants: viscosity, cloud point, pour point, flash and fire point.

Refractories: Classification of refractories with examples, characteristics of a good refractory and applications of refractories.

Nanomaterials: Introduction and applications of nanomaterials.

UNIT IV: Water and its Treatment:

Hardness of Water: Causes of hardness, types of hardness, units of hardness; determination of hardness of water by EDTA method - numerical problems. Boiler troubles – Scales & Sludges, Priming, Foaming, and Caustic Embrittlement; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and Calgon conditioning); External treatment–Zeolite process and Ion exchange process; **Potable Water**-Its Specifications–Disinfection of water by ozonisation, chlorination (break point chlorination and its significance); Reverse Osmosis.

UNIT V: Fuels:

Characteristics of a good fuel, Classification – Solid fuels: Coal – analysis of coal - proximate and ultimate analysis and their significance, Liquid fuels – petroleum and its refining; cracking – Fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol- Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of Natural gas, LPG and CNG; Calorific value of fuel – HCV, LCV; Determination of calorific value by Junker's gas calorimeter.

TEXT BOOKS:

1. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company 14th Edition (2013)
2. Engineering Chemistry by B. Rama Devi, Ch. Venkataramana Reddy and R.P. Mani, CENGAGE learning (2016)

REFERENCE BOOKS

1. Engineering Chemistry by M. Thirumala Chary and E. Laxminarayana, Scitech publications (2016).
2. Engineering Chemistry by Bharathi Kumari and Jyotsna Cherukuri, VGS Techno Series (2016).

Course Outcomes:

- Familiarize the student with the fundamentals of the treatment technologies and the considerations for its design and implementation in water treatment plants.
- Understand the operating principles of various types of electrochemical cells, including fuel cells and batteries.

- 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
- To learn about types of fuels and their characteristics, and combustion systems with emphasis on engineering applications.
- Recently modern materials synthesized find applications in industry and creating instruments for solving problems of electronics, telecommunications, health care, agriculture, and technology etc., In order to emphasize the above the topics like composite materials, polymers, conducting polymers and nanomaterials have been incorporated in the curriculum.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B.Tech MECH-IISEM

L T/P/D C

3 1/-/ 3

(R17A0502) OBJECT ORIENTED PROGRAMMING THROUGH C++

Course Objectives

- To teach the student the concepts of object oriented and generic programming.
- To differentiate between object oriented programming and procedural programming.
- To design applications using object oriented features
- To teach the student to implement object oriented concepts
- To learn the solving and logical skills to programming in C language and also in other languages.

Unit-I: Concepts of Object Oriented programming:

Object oriented paradigm - differences between Object Oriented Programming and Procedure oriented programming, Basic concepts of Object Oriented Programming , Encapsulation, Inheritance and Polymorphism. Benefits of OOP. Structure of a C++ program, namespace, Data types, identifiers, variables, constants, enum, operators, type casting, control structures & loops.

Unit-II: Functions, Classes and Objects:

Introduction of Classes, Class Definition, Defining a Members, Objects, Access Control, Class Scope, Scope Resolution Operator, Inline functions, Memory Allocation for Objects, Static Data Members, Static Member Functions, Array of Objects, Objects as Function Arguments, Default Arguments, Friend Functions

Unit-III: Constructors, Destructors, Inheritance:

Introduction to Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic initialization of Objects, Copy Constructors, Dynamic Constructors, Destructors.

Inheritance: Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi-Level Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Constructors in Derived Classes.

Unit-IV: Pointers, Virtual Functions and Polymorphism:

Introduction, Memory Management, new Operator and delete Operator, Pointers to Objects, this Pointer, Pointers to Derived Classes, Polymorphism, compile time polymorphism, Run time polymorphism, Virtual Functions, Pure Virtual Functions, Abstract Classes, Virtual Base Classes, Virtual Destructors. Function Overloading, Operator overloading, Rules for Operator overloading, overloading of binary and unary operators .

Unit-V: Templates and Exception handling:

Introduction, Class Templates, Class Templates with Multiple Parameters, Function Templates, Function Templates with Multiple Parameters, Member Function Templates.

Exception handling:

Basics of Exception Handling, Types of exceptions, Exception Handling Mechanism, Throwing and Catching Mechanism, Rethrowing an Exception, Specifying Exceptions

TEXT BOOKS:

1. Object Oriented Programming, Special Edition- MRCET, Mc Graw Hill Publishers, 2017.
2. Object Oriented Programming with C++ by Balagurusamy.

REFERENCES:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroustrup, Pearson Educ

COURSE OUTCOMES

- Demonstrate the basic knowledge of computer hardware and software.
- To formulate simple algorithms for arithmetic and logical problems.
- To translate the algorithms to programs (in C language).
- To test and execute the programs and correct syntax and logical errors.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech MECH-I Sem

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

(R17A0302) ENGINEERING DRAWING

Course Objectives:

- To enable the students with various concepts like Dimensioning, Conventions and standards related to working drawing in order to become professionally efficient and to introduce fundamental concepts of curves used in engineering,
- Students are capable to understand the Orthographic Projections of Points and Lines and are able to improve their visualization skills so that they can apply these skills in developing the new products.
- Understands and becomes efficient in applying the concept of Orthographic Projections of Points, Lines and Planes in industrial applications
- Can employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
- Analyze a drawing and can efficiently communicate ideas graphically.

UNIT – I

Introduction To Engineering Drawing: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing- Dimensioning – Lettering practice – BIS Conventions.

- a) Polygons – Construction of regular polygons (General Method only)
- b) Conic Sections (General Method only- Eccentricity Method)
- c) Cycloid, Epicycloid and Hypocycloid
- d) Scales-Plain, Diagonal and Vernier

UNIT – II

Orthographic Projection in First Angle only: Principles of Orthographic Projections – Conventions – First and Third Angle projections (Introduction).

Projections of Points. Points in all four quadrants.

Projections of Lines – Parallel and inclined to both planes.

UNIT – III

Projections of Planes: Projection of regular planes, Plane inclined to both reference planes (No conditional problems).

Projections of Solids: Projections of regular solids prism and pyramid inclined to both planes (No conditional problems).

UNIT – IV

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

UNIT – V

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

Basic Principles of ACAD – Demo Only.

TEXT BOOKS

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers,2017.
2. Engineering Drawing, N.D.Bhatt.
3. Engineering Drawing by K.Venu Gopal&V.Prabu Raja New AgePublications.

REFERENCES

1. Engineering drawing – P.J. Shah .S.ChandPublishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill BookPublishers.

Course Outcomes:

- Getknowledgeonusageofvariousdrawinginstrumentsandcapabletodrawvarious curves like conic curves, cycloidal curves and involutes.
- UnderstandtheOrthographicProjectionsofPointsandLinesandareabletoimprove their visualization skills so that they can apply these skills in developing the new products.
- Understand about orthographic projection and able to draw planes and solids according to orthographicprojections.
- Can employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideasgraphically.
- Toconvertanddrawthegivenorthographicviewtoisometricviewandviceversa.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B.Tech. MECH-II Sem

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

(R17A0582)OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB

Course Objectives:

- To strengthen problem solving ability by using the characteristics of an object-oriented approach.
- To design applications using object oriented features
- To handle Exceptions in programs.
- To teach the student to implement object oriented concepts
- To teach the student to implement object oriented concepts.
- To strengthen problem solving ability by using the characteristics of an object-oriented approach.

Week 1:

Basic C++ Programs

Week 2:

- a) Write a C++ program to find the sum of individual digits of a positive integer.
- b) Write a C++ program to generate the first n terms of this sequence.

Week 3:

- a) Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- b) Write a C++ program to find both the largest and smallest number in a list of integers.

Week 4:

- a) Write a C++ program to sort a list of numbers in ascending order.
- b) Write a program to illustrate New and Delete keywords for dynamic memory allocation

Week 5

- a) Write a program illustrating Class Declarations, Definition, and Accessing Class Members.
- b) Program to illustrate default constructor, parameterized constructor and copy constructors
- c) Write a Program to Implement a Class STUDENT having Following Members:

| Member | Description |
|-------------------------|----------------------|
| Data members | |
| Sname | Name of the student |
| Marks array | Marks of the student |
| Total | Total marks obtained |
| Tmax | Total maximum marks |
| Member functions | |
| Member | Description |

| | |
|-----------|---------------------------|
| assign() | Assign Initial Values |
| compute() | to Compute Total, Average |
| display() | to Display the Data. |

Week 6:

- Write a Program to Demonstrate the i) Operator Overloading. ii) Function Overloading.
- Write a Program to Demonstrate Friend Function and Friend Class.

Week 7:

- Write a Program to Access Members of a STUDENT Class Using Pointer to Object Members.
- Write a Program to Generate Fibonacci Series use Constructor to Initialize the Data Members.

Week 8:

Revision laboratory

Week 9

Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are:

- Reading a matrix.
- Addition of matrices.
- Printing a matrix.
- Subtraction of matrices.
- Multiplication of matrices

Week 10

Write C++ programs that illustrate how the following forms of inheritance are supported:

- Single inheritance
- Multiple inheritance
- Multilevel inheritance
- Hierarchical inheritance

Week 11

- Write a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.
- Write a Program to Invoking Derived Class Member Through Base Class Pointer.

Week 12

- Write a Template Based Program to Sort the Given List of Elements.
- Write a C++ program that uses function templates to find the largest and smallest number in a list of integers and to sort a list of numbers in ascending order.

Week 13

- Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.
- Write a Program to Demonstrate the Catching of All Exceptions.

Week 14

Revision

TEXT BOOKS:

- Object Oriented Programming with C++ by Balagurusamy
- C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.

REFERENCES:

1. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2. The C++ Programming Language, 3rd Edition, B.Stroustrup, Pearson Education.

COURSE OUTCOMES

- Learn problemsolving ability by using the characteristics of an object-oriented approach.
- Explain the applications using object oriented features.
- Explain the handling exception handling
- Able to the student to implement object oriented concepts.
- To teach problemsolving ability by using the characteristics of an object-oriented approach.

MALLAREDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

I Year B. Tech MECH-I Sem

L T/P/D C

- -/3/- 2

(R17A0083) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any EIGHT experiments compulsory)

Course Objectives:

- The engineering students are exposed in physics lab to understand physical parameters practically.
- The list of experiments enables the students to know different branches like mechanics, optics and electronics.
- Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
- Practical implementation of fundamental concepts.
- The students are thoroughly trained in learning practical skills by completing all the experiments in chemistry lab.

Course Outcomes:

- The student learns the concept of error and its analysis and try formulate new solutions to problems related to engineering physical balance, Spectrometer and Microscope.
- The student develops experimental skills to design new experiments in Engineering that accelerates development of society considering the public health and safety of society.
- Comprehension power of the engineering student increases with exposure to these experiments that help them to compare the theory and correlate with experiment.
- This course on physics lab is designed with 12 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

LIST OF EXPERIMENTS: (Any Eight experiments compulsory)

1. Dispersive power of the material of a prism -Spectrometer.
2. Wave length of light –Diffraction grating-using laser.
3. Newton's Rings –Radius of curvature of Plano convex lens.
4. Melde's experiment –Transverse and Longitudinal modes.
5. Time Constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gee's method.
8. Study the characteristics of LED.
9. Evaluation of numerical aperture of given fiber.
10. Energy gap of a material of p-n junction.
11. Rigidity modulus of given wire - Torsional pendulum.
12. Characteristics of a Solar cell.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any Eight experiments compulsory)

Course Objectives:

This course on chemistry lab is designed with 12 experiments in an academic year. It is common to all branches of Engineering in 1stB.Tech.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student. At the end of the course the student is expected to

- Provide the students with a solid foundation in chemistry laboratory required to solve engineering problems.
- Practical implementation of fundamental concepts.

Course Outcomes:

- Students are able to estimate the total hardness and alkalinity present in a sample of water.
- Ability to select lubricants for various purposes.
- Ability to determine the surface tension of a given liquid.
- Ability to prepare advanced polymer materials.
- Ability to know the strength of an acid by conductometric and potentiometric method.
- Ability to find the Fe^{+2} , and Mn^{+2} present in unknown substances/ ores using titrimetric and instrumental methods.

List of Experiments

Titrimetry:

1. Estimation of hardness of water by EDTA method.
2. Estimation of alkalinity of water.

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

Preparation:

9. Preparation of Phenol Formaldehyde Resin (Bakelite)-Demonstration
10. Preparation of Aspirin.

Physical properties:

11. Determination of Viscosity of sample oil by Redwood Viscometer.
12. Determination of Surface Tension of a given liquid by Stalagmometer

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, et al, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R.N. Goyal and Harmendra 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.

COURSE OUTCOMES

- The students learn the concepts of error, analyse and try to formulate new solutions to the problems related to engineering physics.
- B.Tech students basically learn the mechanical behaviour of the wire and practically determine the elastic constant.
- Prepare synthetic drug molecule.
- Determine the strength of an acid by conductometric and potentiometric methods.
- Find the amount of Fe^{+2} and Cu^{2+} present in unknown substances using titrimetric and instrumental methods.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

I Year B. Tech MECH-II Sem

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

(R17A0082) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB- II

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

Course Objectives:

- To make students acquire language skills at their own pace with the usage of authentic learning environment through different media, e-materials and language lab.
- To make learners acquire listening and speaking skills in both formal and informal contexts through diverse interactive sessions and computer aided multi-media training.
- To impart nuances of linguistics to help novices to resolve mother tongue interference by ensuring precision in pronunciation to benefit Standard English.
- To help develop the students communication skills by familiarizing them with different strategies to suit academic as well as workplace contexts.

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

- a. Computer Assisted Language Learning (CALL) Lab
- b. Interactive Communication Skills (ICS) Lab

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

Exercise –IV

CALL Lab: Word Accent – Rules of Stress and Stress shift

ICS Lab: Describing Object, Places, Persons, Events and Experiences.

Exercise –V

CALL Lab: Intonation

ICS Lab: Etiquette – Professional and telephone

Exercise –VI

CALL Lab: Neutralization of Mother Tongue Influence

ICS Lab: Oral Presentations (Team or Individual)

PROJECTS

PROJECTS

Students have to choose one of the following projects for their External Examinations, and submit before the end of the semester. This project carries 10 marks in the Lab External Examinations.

1. **Conduct interview using interrogative sentences.**

Students should interview any teacher, or HOD, or Principal, record their responses and submit the project with those questions and answers. The questions asked should not be less than ten.

2. Project on differences between group discussion and debate.

Students are supposed to do research on the differences between GD and debate and submit a project on it. There should be a minimum of ten points with detailed explanation. Students can use pictures as well.

3. Book Review

Choose any fiction of your choice and write a book review on the following parameters.

- Characterization, plot, theme, message

Please note that the review is not the summary of the story. The project should not be less than 250 words.

4. Idioms and Phrasal Verbs

Collect at least ten idioms and ten phrasal verbs and concoct a story using those expressions. Word limit is 250.

5. Project on Kinetics

Students are expected to read and research on body language and their implications. You have to make a list of at least ten body movements with pictures and explain them properly.

6. UK and US Vocabulary

Find words that are used differently in UK and US English. Make separate lists for different spellings and different pronunciations. The project can answer one or more of the following questions:

- Which pronunciation do you think are Indians following?
- Which one is your choice? Which one do you feel comfortable in speaking?
- Are we Indians influenced by both UK and US English? How can you prove it?

7. Magazine Article Review

Pick a magazine article with a social relevance, which has around 2500 words. Write a review of 250 words as a project. Make sure you voice your opinion in the review.

8. Career Guidance Project

Browse the net and gather information on any professional competitive exam of your choice, like UPSC or GRE. Prepare and present a paper on the scope and relevance of the exam of your choice. The paper should have a minimum of 300-400 words. Students are expected to answer the questions asked by the audience after the paper presentation.

9. Mother Tongue Influence

Choose a particular paragraph of 250 words and ask five of your friends, from different states, to read that. One has to record their accent and pronunciation to check the difference. Make a list of ten words that each one pronounces differently. Find out the reasons behind the differences in pronunciations.

Also, mention the correct pronunciation in your project with transcription.

10. Correction of Letter Writing: Language, Sentences, Spelling, Tone and Format

Teacher will distribute a set of five letters with errors in spelling, tone, grammar and sentence construction. Give the correct form of the letters as the project

ELCS LAB:**3. Computer Assisted Language Learning (CALL) Lab:**

The Computer aided Language Lab for 60 students with 60 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 –2.8GHZ
 - b) RAM –512 MB Minimum
 - c) HardDisk –80GB
- ii) Headphones of High quality

4. Interactive Communication Skills (ICS) 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.

REFERENCES:

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):

1. Suresh Kumar, E. & Sreehari, P. 2009. A Handbook for English Language Laboratories. New Delhi: Foundation
2. Speaking English Effectively 2nd Edition by Krishna Mohan and N.P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V. & Dhamija, P.V. How to Prepare for Group Discussion and Interviews. Tata McGraw Hill
4. Hancock, M. 2009. English Pronunciation in Use. Intermediate. Cambridge: CUP
5. Spoken English: A Manual of Speech and Phonetics by R.K. Bansal & J.B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. English Pronunciation in Use. Advanced. Cambridge: CUP
7. Marks, J. 2009. English Pronunciation in Use. Elementary. Cambridge: CUP
8. Nambiar, K.C. 2011. Speaking Accurately. A Course in International Communication. New Delhi: Foundation
9. Soundararaj, Francis. 2012. Basics of Communication in English. New Delhi: Macmillan
10. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. English Pronouncing Dictionary Daniel Jones Current Edition with CD.
12. A text book of English Phonetics for Indian Students by T. Balasubramanian (Macmillan)

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 University 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 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 with the help of another member of the staff of the same department of the other institution.

Course Outcomes:

- Learning with precision through computer-assisted individualized and independent language learning to work independently in engineering setup.
- Improved conversational reception and articulation techniques in the course of repetitive instruction thereby gaining confidence both in institutional and professional environment.
- Accuracy in pronunciation and restoring Standard English thereby crafting better command in English languages so that the students have a cutting edge over others in society.
- Imbibing appropriate use of language in situations to work as an individual and as a leader in diverse teams.
- Use polite expressions in all formal situations.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME-ISem

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

(R17A0303) ENGINEERING THERMODYNAMICS

Course Objectives:

- To understand the concepts of energy transformation, conversion of heat into work.
- To understand why and how natural processes occur only in one direction unaided.
- To apply the concepts of thermodynamics to basic energy systems.
- To understand how the change of state results in a process.
- Why air standard cycles are important.

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

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. 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.

UNIT-IV

Mixtures of perfect Gases :Mole Fraction, Mass fraction 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-Psychrometric Properties–Drybulb Temperature, WetBulb 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.

UNI-V

Power Cycles :Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Ericsson 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. Refrigeration Cycles : Brayton and Rankine cycles – Performance Evaluation – combined cycles, Bell Coleman cycle, Vapour compression cycle-performance Evaluation.

TEXT BOOKS:

1. Engineering Thermodynamics, Special Edition. MRCET, McGrawHill Publishers.
2. Engineering Thermodynamics / PK Nag /TMH, III Edition
3. Thermodynamics – J.P.Holman /McGrawHill

REFERENCE BOOKS:

1. Engineering Thermodynamics – Jones & Dugan
2. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles/TMH
3. An introduction to Thermodynamics / YVC Rao / NewAge
4. Engineering Thermodynamics – K. Ramakrishna / Anuradha Publisher

Course Outcomes:

- To differentiate between quality and quantity of energy, heat and work, enthalpy and entropy, etc.
- Quantify the irreversibilities associated with each possibility and choose an optimal cycle.
- Able to analyze Mollier chart, Gas tables in order to estimate thermodynamic properties such as WBT, DBT, RH etc.
- Able to utilize psychrometric chart and estimate the various psychrometric properties.
- Assess which cycle to use for a given application and source of heat.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-I Sem

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

(R17A0304) MATERIAL SCIENCE

Course Objectives:

- To understand various mechanical properties of materials.
- To understand how and why the properties of materials are controlled by its structure at the microscopic and macroscopic levels.
- To understand how and why the structure and composition of a material may be controlled by processing.
- To create different types of composite materials and its applications.
- To remember polymer material classifications and applications.

UNIT-I

Structure of Materials: Structure of atom – Atomic models – Bonding in solids – Bonding forces and energies – Ionic, Covalent, metallic and van der Waals Bond - Crystal structure - Unit Cell – Bravais lattice – BCC – FCC – HCP - Interstitial sites – NaCl crystal – CsCl crystal – Perovskite structure – Diamond structure – Graphite – Crystal directions and planes.

UNIT-II

Structure of Metals and Alloys - Imperfection in crystals – Point defects – Dislocations – Slip plane – Movement of dislocations – Planar defects and grain boundaries – solid solutions – Hume Rothery rule – Phase diagram – Lever rule – Gibb's phase rule – Phase diagram for binary alloys – Eutectic – Peritectic – Eutectoid – Zone refining.

UNIT-III

Heat Treatment Methods: Annealing, hardening, tempering, normalizing, surface hardening
Ferrous and Non Ferrous Alloys: Allotropy and phase change of pure iron – Classification of steels and cast iron – iron – carbon equilibrium diagram – Microstructure of iron and steel - Ferrous alloys and their applications – Heat treatment - Factors affecting conductivity of a metal – Electrical Resistivity in alloys – Thermal conductivity of metals and alloys – Silver, Copper and aluminum – High Resistivity alloys – nichrome, manganin, constantan and kanthal and their composition and applications – Super hard materials - Tungsten carbide and Boron nitrides.

UNIT-IV

Ceramic and Composite Materials : Advanced Ceramic Materials - Crystal Structures - Silicate Ceramics - Glasses – Glass Ceramics – Functional properties and applications of ceramic materials – Classification of composites - Fiber reinforced materials – Law of mixtures – Continuous fibers – discontinuous fibers – Particle-reinforced materials – Cermets – Dispersion strengthened materials – Laminates - Application of composites in electrical and mechanical components – nuclear industry.

UNIT-V

Polymer Materials: Classification of polymer – Mechanisms of polymerisation - Some commercially important individual polymer – Thermoplastics - Elastomers – Thermosets – Engineering plastics - Liquid crystal polymers - Conductive polymers – High Performance fibers - Biomedical applications – Photonic polymers.

TEXT BOOKS:

1. Material Science by Dr. Kodgire, Everestpublications,Pune.
2. V.Raghavan, Material Science and Engineering, Prentice –Hall of India Pvt. Ltd.,2007
3. Sidney H. Avner, Introduction to physical metallurgy, Tata Mc-Graw-Hill, Inc.1997.

REFERENCE BOOKS:

1. DonaldR.Askeland,PradeepP.Phule,TheScienceandEngineeringofMaterials4th Edition,Thomson/Brooks/Cole,2003.
2. WilliamF.Smith,StructuralPropertiesofEngineeringAlloys,TataMc-Graw-Hill,Inc., 1993.
3. Kingery.W.D.,BowenH.K.andUhlmannD.R.,IntroductiontoCeramics,2ndEdition, John Wiley & Sons, New York,1976.

Course Outcomes:

- Summarizing the concepts of material science properties in the design and development of mechanical systems.
- Creativenessinnewsystemscomponentsandprocessesinthefieldofengineering.
- Interpretingtheheattreatmentprocessandtypesofalloysformechnical engineering applications useful to the society.
- Producedifferentmethodsofcompositematerialsforautomobileandaeronautical applications.
- To recalling relevant knowledge fromlong term memory in types of polymers.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-I Sem

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

(R17A0206) ELECTRICAL AND ELECTRONICS ENGINEERING

Course Objectives:

- This course introduces the concepts of electrical DC and AC circuits, basic law's of electricity, instruments to measure the electrical quantities, different methods
- To solve the electrical networks, construction operational features of energy conversion devices i.e. DC and AC machines, transformers.
- It also emphasizes on basics of electronics, semiconductor devices and their characteristics and operational features.
- To impart the knowledge of various configurations, characteristics and applications.
- To learn the Constructional details & operations of DC Machines & Transformers.

UNIT-I

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, Capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

Instruments: Basic Principle of indicating instruments, Permanent magnet moving coil and moving iron instruments.

UNIT-II

DC Machines: Principle of operation and operation of DC Generator, EMF equation, Types, Losses and efficiency, Magnetization and load characteristics of DC generators. DC Motors-Types, Characteristics, Losses and efficiency, Swinburne's Test, 3-Point starter, Speed control of DC shunt motor-Flux and armature voltage control methods.

UNIT-III

Transformers: Principle of operation of single phase transformers, EMF equation, Equivalent circuit, Losses, OC and SC tests, Efficiency and regulation.

AC Machines: Principle of operation of induction motor, slip-torque characteristics, Applications. Principle of operation of alternators, Regulation by synchronous impedance method.

UNIT-IV

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode applications, and Rectifiers – Half wave, Full wave and Bridge rectifiers (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.

TEXT BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarti, Sudiptanath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
3. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, Tata McGraw- Hill companies.

REFERENCE BOOKS:

1. Basic Electrical Engineering, T.K. Nagasarkar and M.S. Sukhija, Oxford University Press.
2. Basic Electrical Engineering by D.P. Kothari, I.J. Nagrath, McGraw-Hill.
3. Millman's Electronic Devices and Circuits, J. Millman, C.C. Halkias, and Satyabrata Jit, Tata McGraw-Hill companies.

Course Outcomes:

- After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, electromechanical energy conversion, construction and operational characteristics of DC and AC machines
- The constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc., different semiconductor devices, operation of diodes and transistors, their voltage-current characteristics, realization of various electronic circuits with the various semiconductor devices, and cathode ray oscilloscope,
- With which he/she can be able to apply the above conceptual things to real-world electrical, electronic problems and applications.
- Fundamentals Of Constructional Details And Principle Of Operation Of DC Machines And Transformers.
- Solve differential equations with initial conditions using Laplace Transform.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ,ME-I Sem

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

(R17A0305) STRENGTH OF MATERIALS

Course Objectives:

- To understand the nature of stresses induced in material under different loads.
- To plot the variation of shear force and bending moments over the beams under different types of loads.
- To understand the behavior of beams subjected to shear loads.
- To understand the behavior of beams under complex loading.
- To analyze the cylindrical shells under circumferential and radial loading

UNIT-I

Simple Stresses & Strains : Elasticity and plasticity – Types of stresses & strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio & volumetric strain – Elastic moduli & 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 Diagrams: 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

Flexural 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 angle sections.

UNIT-IV

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 & tension coefficient methods.

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. Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

UNIT-V

Torsion of Circular Shafts: Theory of pure torsion, Derivation of torsion equations: $T/J = q/r = N\theta/L$ - Assumptions made in theory of pure torsion-Torsional moment of resistance – Polar section modulus – Power transmitted by shaft s

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 – Thin spherical shells.

TEXT BOOKS:

1. Strength of materials by Bhavikatti, Lakshmi Publications.
2. Strength of materials by Sadhu Singh. Khanna Publications.
3. Strength of Materials by S. Timoshenko

REFERENCE BOOKS:

1. Strength of Materials -By Jindal, Umesh Publications.
2. Strength of Materials by R.K. Bansal, Laxmi Publications 2010.
3. Mechanics of Structures Vol-III, by S.B. Junnarkar.

Course Outcomes:

- Determine the simple stresses and strains when members are subjected to axial loads.
- Draw the shear force and bending moment diagrams for the beams subjected to different loading conditions.
- Evaluate stresses induced in different cross-sectional members subjected to shear loads.
- Evaluate the deflections in beams subjected to different loading conditions.
- Analyze the Shafts and thick cylindrical shells.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-I Sem

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

(R17A0306) KINEMATICS OF MACHINERY

Course Objectives:

- To impart knowledge on various types of Mechanisms and synthesis
- To Synthesize and analyze 4 bar mechanisms
- To impart skills to analyse the position, velocity and acceleration of mechanisms
- To perform synthesis of mechanism by analytical and graphical method
- To familiarize higher pairs like cams and principles of cam design
- To study the relative motion analysis and design of gears, gear trains.

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 Russel 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 Hooke's joint Universal 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. Maximum 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.

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

TEXT BOOKS:

1. Kinematics of Machinery – Special Edition. MRCET, McGraw Hill Publishers.
2. Theory of Machines by Thomas Bevan/CBS
3. Theory of machines/ PL. Balaney/khanna publishers.

REFERENCE BOOKS:

1. The theory of Machines / Shigley/Oxford.
2. Mechanism and Machine Theory/JS Rao and RVDukkipati/New Age International Publishers
3. Theory of Machines / R.K Bansal/Fire Wall media Publisher

Course Outcomes:

- Understand the principles of kinematic pairs, chains and their classification, DOF, inversions, equivalent chains and planar mechanisms.
- Analyze the planar mechanisms for position, velocity and acceleration.
- Synthesize planar four bar and slider crank mechanisms for specified kinematic conditions.
- Design cams and followers for specified motion profiles
- Evaluate gear tooth geometry and select appropriate gears for the required applications.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-I Sem

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

(R17A0310) MACHINE DRAWING

Course Objectives:

- To visualize an object and convert it into a drawing,
- To gain knowledge of conventional representation of various machining and mechanical details as per IS.
- To gain knowledge of threads, bolts, nuts, stud bolts, tap bolts, setscrews, Keys, cottered joints and knuckle joint.
- To gain knowledge of Riveted joints, shaft coupling, pipe joints.
- To become conversant with 2-D and 3-D drafting

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 and their liberal usage.
- e) Types of drawings – working drawings for machine parts.
- f) Sections and development of solids.

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, setscrews.
- b) Keys, cottered joints and knuckle joint.
- c) Riveted 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 box, cross heads, Eccentric, Petrol Engine connecting rod.
- b) Other machine parts- Screw jack, Machine Vice, 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.

TEXT BOOKS:

1. Machine Drawing – K.L.Narayana, P.Kannaiah & K.VenkataReddy / New Age Publishers
2. Machine Drawing – Dhawan, S.Chand Publications
3. Machine Drawing By Siddeswar & Kanna

REFERENCE BOOKS:

1. Machine Drawing – P.S.Gill.
2. Machine Drawing – Luzzader
3. Machine Drawing – Rajput

Course Outcomes:

- Student will be able to Visualize and prepare detail drawing of a given object.
- Student will be able to draw threads, bolts, nuts, stud bolts, tap bolts, setscrews, Keys, Cottered joints and knuckle joint.
- Draw Riveted joints, shaft coupling, pipe joints.
- Draw details and assembly of mechanical systems, Read and interpret a given drawing
- Create 2-D and 3-D models using any standard CAD software with manufacturing considerations.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - I Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0282) ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Course Objectives:

- To Design Electrical Systems.
- To Analyze A Given Network By Applying Various Network Theorems.
- To Expose The Students To The Operation Of DC Generator.
- To Expose The Students To The Operation Of DC Motor and Transformer.
- To get the knowledge using electrical measuring devices.

SECTION-A: ELECTRICAL ENGINEERING

1. Magnetization characteristics of D.C. shunt generator.
2. Speed control of DC shunt motor.
3. Swinburne's test on DC shunt machine.
4. Brake test on DC shunt motor.
5. OC and SC tests on Single-phase transformer.
6. Brake test on 3-phase induction motor.
7. Regulation of an alternator by synchronous impedance method.

SECTION-B: ELECTRONICS ENGINEERING

1. PN Junction diode characteristics.
2. Zener diode characteristics.
3. Half wave rectifier with and without filter.
4. Full wave rectifier with and without filter.
5. Transistor CB characteristics (Input and Output).
6. Transistor CE characteristics (Input and Output).

Note: Total 10 experiments are to be conducted.

Course Outcomes:

- Be able to explain about electrical systems.
- Explain the concept of circuit laws and network theorems and apply them to laboratory measurements.
- Be able to systematically obtain the equations that characterize the performance of an electric circuit as well as solving both single phase and DC Machines.
- Acknowledge the principles of operation and the main features of electric machines and their applications.
- Acquire skills in using electrical measuring devices.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - I Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0381) MATERIAL SCIENCE AND STRENGTH OF MATERIALS LAB

Course Objectives:

- To Remembering the composition of metals, mechanical properties depending upon their microstructure
- To Understand the Heat treatment methods and their effect on microstructure of materials.
- To applying the procedure for Micro Structure of pure metals
- To determine experimental data include universal testing machines and torsion equipment.
- To determine experimental data for spring testing machine, compression testing machine, impact tester, hardness tester.

(A) MATERIAL SCIENCE LAB:

1. Preparation and study of the Micro Structure of pure metals like Iron, Cu and Al.
2. Preparation and study of the Micro structure 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. Hardness of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

(B) STRENGTH OF MATERIALS LAB:

1. Direct tension test
2. Bending test on
 - a) Simple supported
3. Torsion test
4. Hardness test
 - a) Brinell's hardness test
 - b) Rockwell hardness test
5. Test on springs
6. Compression test on cube
7. Impact test

Note: Total 10 experiments are to be conducted.

Course Outcomes:

- Summarizing can understand micro structures of different material
- Different heat treatment methods and change of mechanical properties based on micro structure of methods.

- Producedifferentmethods inIroncarboneyquilibriumdiagramsformaterialscience applications.
- Analyze and design structural members subjected to tension, compression, torsion, bendingandcombinedstressesusingthefundamentalconceptsofstress, strainand elastic behavior ofmaterials.
- Understandthebasicconceptsofstress, strain, deformation, andmaterialbehavior under different types of loading (axial, torsion, bending).
- Performstressanalysisanddesignofbeamssubjectedtobendingandshearingloads using severalmethods.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - I Sem

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

(R17A0006) GENDER SENSITIZATION

(An Activity – based Course)

Course Objectives:

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

UNIT – I

UNDERSTANDING GENDER:

Gender: Why should we study it? (*Towards a world of Equals: Unit – 1*)

Socialization: Making women, making men (*Towards a World of Equals: Unit – 2*)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

Just Relationships: Being Together and Equals (*Towards a World of Equals: Unit – 12*)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers.

Further Reading: Rosa Parks – The Brave Heart.

UNIT – II

GENDER AND BIOLOGY:

Missing Women: Sex Selection and its Consequences (*Towards a World of Equals: Unit – 4*)

Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (*Towards a World of Equals: Unit – 10*)

Two or Many? Struggles with Discrimination.

Additional Reading: Our Bodies, Our Health (*Towards a World of Equals: Unit – 13*)

UNIT – III

GENDER AND LABOUR:

Housework: the Invisible Labor (*Towards a World of Equals: Unit – 3*)

“My Mother doesn't Work”. *Share the Load*.

Women's Work: Its Politics and Economics (*Towards a World of Equals: Unit – 7*)

Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work

UNIT – IV

ISSUES OF VIOLENCE:

Sexual Harassment: Say No! (*Towards a World of Equals: Unit – 6*)

Sexual Harassment, not Eve – teasing – Coping with Everyday Harassment – Further Reading: “Chupulu”.

Domestic Violence: Speaking Out (*Towards a World of Equals: Unit – 8*)

Is Home a Safe Place? – When Women Unite [Film]. Rebuilding Lives. Further Reading. New Forums for justice.

Thinking about Sexual Violence (Towards a World of Equals: Unit – 11)

Blaming the Victim – “! Fought for my Life” – Further Reading. The Caste Face of Violence.

UNIT –V

GENDERS STUDIES:

Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit – 5)

Point of View. Gender and the Structure of Knowledge. Further Reading. Unacknowledged Women Artists of Telangana

WhoseHistory?QuestionsforHistoriansandOthers(TowardsaWorldofEquals:Unit–9)

Reclaiming a Past. Writing other Histories. Further Reading. Missing Pages from Telangana History.

Essential Reading: All the Units in the Text books, “Towards a World of Equals: A Bilingual Textbook on Gender” Written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu.

Note: Since it is an interdisciplinary course, resource persons can be drawn from the fields of English Literature of Sociology or Political Science or any other qualified faculty who has expertise in this field.

REFERENCE BOOKS:

1. Sen, Amartya. “More than Once Million Women are Missing”. New York Review of Books 37.20 (20 December 1990). Print. `We Were Making History.....’ Life Stories of Women in the Telangana People’s Struggle. New Delhi: Kalika Women, 1989.
2. Tripti Lahiri. “By the Numbers: Where India Women Work.” Women’s Studies Journal (14 November 2012) Available online at: <http://blogs.wsj.com/india-realist/2012/11/14/by-the-numbers-where-indian-women-works/>
3. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada <http://harpercollins.co.in/BookDetail.asp?BookCode=3732>
4. Vimala “Vantilu (The Kitchen)”. Omen Writing in India: 600 BC to the Present, Volume II The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.
5. Shatrughna, Veena et al. Women’s Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, India Council of Medical Research 1993.
6. Stress Shakti Sanghatana. “We Were Making History....’ Life Stories of Women in the Telangana People’s Struggle. New Delhi: Kali of Women, 1989.
7. Menon, Nivedita. Seeing Like a Feminist. New Delhi. Zubaan-Penguin Books, 2012.
8. Jayaprabha, A. “Chupulu (Stares)”. Women Writing in India: 600 BC to the Present. Volume II: The 20th Century Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.

9. Javeed, Shayam and Anupam Manuhaar. "Women and Wage Discrimination in India: A Critical Analysis". International Journal of Humanities and Social Science Invention 2, 4(2013).
10. Gautam, Liela and Gita Ramaswamy. "A 'Conversation' between a Daughter and Mother". Broadsheet on Contemporary Politics. Special Issue on Sexuality and Harassment: Gender Politics on Campus Today. Ed. Madhumeeta Sinha and Asma Rasheed. Hyderabad: Anveshi research Center for Women's Studies, 2014.
11. Abdulali Sohaila. "I Fought For My Life...and Won." Available online at: <http://www.thealternative.in/lifestyle/i-fought-for-my-life-and-won-sohaila-abdulali/>
12. Jeganathan Pradeep, Partha Chatterjee (Ed). "Community, Gender and Violence Subaltern Studies XI". Permanent Black and Ravi Dayal Publishers, New Delhi, 2000
13. K. Kapadia. The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India. London: Zed Books, 2002.
14. S. Benhabib. Situating the self: Gender, Community, and Postmodernism in Contemporary Ethics, London: Routledge, 1992.
15. Virginia Woolf A Room of One's Oxford: Black Swan. 1992.
16. T. Banuri and M. Mahmood, Just Development: Beyond Adjustment with a Human Face, Karachi: Oxford University Press, 1997.

Course Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0307) DYNAMICS OF MACHINERY

Course Objectives:

- To study about gyroscope and its effects during precession motion of moving vehicles.
- To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms.
- Able to learn about the working of Clutches, Brakes, Dynamometers and Flywheel.
- To study about the balancing, unbalancing of rotating masses and the effect of Dynamics of undesirable vibrations.
- To understand the working principles of different type governors and its characteristics.

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: Introduction -Free Body Diagrams – Conditions for equilibrium – Two, Three and Four Members – Inertia forces and D’Alembert’s Principle – planar rotation about a fixed centre.

Friction in Machine Elements: Inclined plane-Friction of screw and nuts – Pivot and collars-uniform pressure, uniform wear-friction circle and friction axis: lubricated surfaces-boundary friction-film lubrication.

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

Governors :Watt, Porter and Proell governors. Spring loaded governors – Hartnell and hartung with auxiliary springs. Sensitiveness, isochronism and hunting.

TEXT BOOKS:

1. Theory of Machines / Thomas Bevan / CBS Publishers
2. Theory of Machines / Jagadish Lal & J.M. Shah / Metropolitan.
3. Theory of machines / Khurmi/S.Chand Publications

REFERENCE BOOKS:

1. Theory of Machines / Shiegly / MGH Publishers.
2. Mechanism and Machine Theory / JS Rao and RV Dukupati / New Age International Publishers
3. Theory of Machines / S.S Ratan/ Mc. Graw Hill Publishers

Course Outcomes:

- Knowledge acquired about Gyroscope and its precession motion.
- Able to predict the force analysis in mechanical system and able to solve the problem.
- The student will learn about the kinematics and dynamic analysis of machine elements.
- Ability to understand the importance of balancing and implications of computed results in dynamics to improve the design of a mechanism
- Student gets the exposure of different governors and its working principle.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0308) THERMAL ENGINEERING

Course Objectives:

- Introduction, Engine Types and their Operation. Application of the principles of thermodynamics to components and systems.
- Understand and describe the gas exchange and combustion processes in diesel engines.
- Good understanding of the various IC engines, Compressors and cycles for electricity generation.
- The purpose of this course is to enable the student to gain an understanding of how thermodynamic principles govern the behavior of various systems
- Student have knowledge of methods of analysis and design of complicated thermodynamic systems

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 of IC Engines : 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.

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.

TEXT BOOKS:

1. I.C. Engines / V. GANESAN-TMH
2. Thermal Engineering / Rajput / LakshmiPublications.
3. IC Engines – Mathur & Sharma – Dhanpath Rai & Sons.

REFERENCE BOOKS:

1. Thermal Engineering / Rudramoorthy -TMH
2. Thermodynamics & Heat Engines / R.S. Yadav/ Central Book Depot.,Allahabad
3. Thermal Engineering – R.S. Khurmi&J.K.Gupta –S.Chand

Course Outcomes:

- To be able to recognize main and supplementary elements of SI and CI engines and define operational principles.
- To be able to describe the most important combustion concepts and problems in concern with SI engines and CI engines.
- To be able to analyze energy distribution in an internal combustion engines. Develop problem solving skills through the application of thermodynamics.
- To understand the velocity triangles in compressors. Solve problems associated with Rotodynamic compressors.
- Solve problems associated with reciprocating compressors and expanders and internal combustion engines.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0309) FLUID MECHANICS AND HYDRAULIC MACHINERY

Course Objectives:

- To give insight knowledge on fluid statics and kinematics.
- To gain knowledge on fluid dynamics.
- To give basic understanding of Hydro Electric power plant and importance of impact of jets.
- To become familiar about different types of turbines and able to analyze the performance characteristics of various turbines.
- To be able to understand the working of power absorbing devices like pumps and able to analyze their performance characteristics.

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.

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.

UNIT-II

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

UNIT-III

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 done 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 –

UNIT-IV

Draft tube theory Sfunctions 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 – manometric head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH.

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

TEXT BOOKS:

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.
3. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International

REFERENCE BOOKS:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
3. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley, Wiley & Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements).

Course Outcomes:

- Gain the knowledge on fluid mechanics fundamentals like fluid statics and fluid kinematics
- Have basic idea about the fundamental equations used in Fluid Dynamics and are able to apply these concepts in real working environment
- Study the fundamental soft turbomachinery and elements of hydroelectric power plant.
- Measure the performance of the different types of Hydraulic Turbines
- Calculate the performance of the different types of Hydraulic Pumps.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0311) PRODUCTION TECHNOLOGY

Course Objectives:

- The primary objective of this course is to introduce the concept of manufacturing technology with the help of various processes widely employed in industries.
- The course consists of casting, welding, sheet metal forming, extrusion and forging processes with the related details of equipment and applications.
- To understand various metal working process. To appreciate the capabilities, advantages and the limitations of the processes.
- To understand the various concepts of drawing, its classification and their applications.
- To understand the various concepts of metal forming and forging along with their applications.

UNIT-I

Casting: Steps involved in making a casting – Types of patterns – Patterns and Pattern making
 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 a) Centrifugal b) Die c) Investment. Methods of Melting: Crucible melting and cupola operation, steelmaking processes.

UNIT-II

Welding: A) 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 and Plasma (Air and water) welding. B) Cutting of Metals: Oxy – Acetylene Gas cutting, water plasma. Cutting of ferrous, non-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, plastic blow and injection moulding.

UNIT-IV

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.

UNIT-V

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: Rotary forging – forging defects.

TEXTBOOKS:

1. Manufacturing Technology, P.N.Rao, TMH
2. Manufacturing Technology, Kalpak Jain, Pearson education.
3. Production Technology, R.K.Jain

REFERENCE BOOKS:

1. Principles of Metal Castings, Rosenthal.
2. Welding Process, Parmar
3. Manufacturing Technology, R.K. Rajput, LaxmiPub

Course Outcomes:

- Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts of manufacturing science in the design and development of mechanical systems.
- Competence to design a system, component or process to meet societal needs within realistic constraints.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering in general and mechanical engineering in particular.
- An ability to formulate solve complex engineering problem using modern engineering and information Technology tools.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0061) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

- To create the evolution and basic principles of managerial economics and to understand the concept of demand, its significance, forecasting and elasticity of demand.
- To understand analysis of cost and production in the process of utility creation.
- To understand the concept of market, types of markets and how firms determine price output determination under different markets.
- To understand the theory of capital and its significance, accounting principles, and various forms for preparation of final accounts.
- To analyze various capital budgeting methods to take decision making towards projects and investments.

UNIT-I

Introduction to Managerial Economics: Definition, Nature and scope of Managerial economics, Micro and Macroeconomic concepts.

Demand Analysis: Demand Determinants, Law of Demand and exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand. Demand Forecasting, Factors governing demand Forecasting, methods of demand Forecasting.

UNIT-II

Production & Cost Analysis: Production Function- Isocost and Isoquants MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

UNIT-III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Objectives and Policies of Pricing- Methods of Pricing.

Business: Features of different forms of Business Organisation, Changing Business Environment in Post-liberalization scenario.

UNIT-IV

Introduction to Capital and Financial Accounting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance – Trading forecast, Capital Budget, Cash Budget. Accounting Definition, Concepts and Conventions (GAAP), Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

UNIT-V

Investment Decision: Features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

TEXTBOOKS:

1. A.R.Aryasri, Managerial Economics, Sultan Chand,2009.
2. S.A.Siddiqui&A.S.Siddiqui,ManagerialEconomicsandFinancialAnalysis,NewAge International Publishers, Hyderabad2013
3. M.KasiReddy&Sarawathi,ManagerialEconomicsandFinancialAnalysis,PHI,New Delhi, 2010.

REFERENCE BOOKS:

1. S.N.Maheswari&S. K. Maheswari, Financial Accounting, Vikas,2012.
2. D.N. Dwivedi, Managerial Economics, Vikas,2012.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage,2012

Course Outcomes:

- To understand fundamental concepts of economics and enable students show these concepts are utilized in business management.
- Evaluate student's understanding of the production, technical relationship in factors of production, its process and impact of various costs on production.
- To understand student's knowledge of market types and how firms determine their production levels in different competitive situations.
- To remember student's understanding of how business will maintain accounting books and financial position of the business in the market.
- To understand student's ability to take better decisions towards investment proposals.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - II Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0382) PRODUCTION TECHNOLOGY LAB

Course Objectives:

- To know about the casting of different materials.
- Study and Practice different welding processes.
- To learn the operation of hydraulic press operation for different materials.
- Understand the Process of blow and Injection Moulding.
- To learn the Processing of different materials.

List of Experiments

1. METAL CASTING LAB:

Pattern Design and making - for one casting drawing.
 Sand properties testing - Exercise - for strengths, and permeability –1
 Moulding Melting and Casting - 1 Exercise

2. WELDING LAB:

ARC Welding Lap & Butt Joint - 2 Exercises
 Spot Welding - 1 Exercise
 TIG Welding - 1 Exercise
 Plasma welding and Brazing - 2 Exercises
 (Water Plasma Device)

3. MECHANICAL PRESS WORKING:

Blanking & Piercing operation and study of simple, compound and progressive press tool.
 Hydraulic Press: Deep drawing and extrusion operation.

4. PROCESSING OF PLASTICS

Injection Moulding
 Blow Moulding

Note: Total 10 experiments are to be conducted.

Course Outcomes:

- Learn about patterns and casting of metals.
- Understand the concept of Arc, Spot, TIG welding and brazing process.
- Understand the Process of simple, compound and progressive press and Hydraulic press
- Learn the Moulding process of plastic materials
- Understand the processing of different materials in the lab.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ME - II Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0383) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Objectives:

- To gain knowledge in performance testing of Hydraulic Turbines and Hydraulic Pumps at constant speed and head.
- To provide practical knowledge in verification of principles of fluid flow.
- To calculate C_d, C_c, C_v and Coefficient of impact of various hydraulic systems
- To understand Major and minor losses.
- Student able to learn about measuring pressure, discharge and velocity of fluid flow.

List of Experiments

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 Orificemeter.
10. Determination of friction factor for a given pipeline.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Bernoulli's theorem apparatus.

Note: Total 10 experiments are to be conducted.

Course Outcomes:

- To provide the students' knowledge in calculating performance analysis in turbines.
- Students exposure to study various operating characteristics of Centrifugal pump and Reciprocating pump.
- Analyze a variety of fluid flow devices and utilize fluid mechanics principles in design.
- Get Exposure to verification of Bernoulli's Theorem.
- To provide the students with a solid foundation in fluid flow principles.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ,ME-II Sem

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

FOREIGN LANGUAGE-FRENCH (R17A0004)

INTRODUCTION:

Au vu de l'importance croissante des langues étrangères comme outil de communication dans certains pays du globe, le français a été identifié comme l'une des langues les plus sollicitées après l'anglais. De ce fait, tout en insistant sur la formation en compétences communicatives, le programme a été élaboré pour développer des aptitudes linguistiques et communicatives des étudiants ingénieurs. Le cours de français, sera centré sur les compétences orales de base.

Course Objectives:

- To improve the basic speaking skills of the French language.
- To hone the basic sentence constructions in day to day expressions for communication in their workplace.

SYLLABUS

UNITE - I:

• Objectif communicatifs (LSRW)

- Se présenter / Présenter quelqu'un - Entrer en contact – Saluer – Epeler - poser des questions - comprendre et remplir un formulaire

• Grammaire

- Les formules de politesse
- L'alphabet
- Les nombres de 1 à 30
- Le verbe "être" et "avoir" au présent de l'indicatif

• Vocabulaire

- Les professions
- Les nationalités

UNITE - II:

• Objectif communicatifs (LSRW)

Parler de sa famille – décrire quelqu'un – exprimer ses goûts et les préférences – écrire et comprendre un message court – compter jusqu'à 100 – exprimer la possession – exprimer la négation

• Grammaire

- Les articles
- Les verbes en -er- au présent
- Les noms (genre et nombre)
- Les adjectifs possessifs

- Les adjectifs qualificatifs
- « Qu'est-ce que c'est ? » / « Qui est-ce ? » / « c'est... »
- L'annexion

- **Vocabulaire**

- La famille
- Les vêtements
- Les couleurs
- Les nombres de 1 à 100
- La salle de classe

UNITE – III

- **Objectif communicatifs (LSRW)**

Parler de ses activités quotidiennes – se situer dans le temps – demander et indiquer la date et l'heure – parler des sports et des loisirs – exprimer la fréquence.

- **Grammaire**

- L'expression du temps (l'heure)
- Les verbes –ir- au présent
- Les verbes faire, aller, prendre, venir,
- Les adverbes
- Les verbes pronominaux

- **Vocabulaire**

- Les jours et les mois de l'année
- La vie quotidienne
- Les sports
- Les loisirs

UNITE – IV

- **Objectif communicatifs (LSRW)**

Exprimer la quantité – demander et donner le prix – exprimer la nécessité, la volonté et la capacité – comparer (adjectif) – s'exprimer au restaurant / dans les magasins

- **Grammaire**

- Pouvoir, vouloir, il faut
- Exprimer la capacité / la possibilité
- Exprimer la volonté / le désir
- Le futur proche

- **Vocabulaire**

- L'alimentation
- Les repas
- Les fruits et légumes
- Les parties du corps

UNITE – V

- **Objectif communicatifs (LSRW)**

Exprimer l'interdiction et l'obligation- décrire un appartement – parler du temps qu'il fait / demander le temps qu'il fait – demander l'opinion – donner son avis – exprimer son accord ou son désaccord

- **Grammaire**

- Les adjectifs démonstratifs
- Les prépositions
- Le verbe 'devoir' et 'falloir' au présent
- « Il y a » et « Depuis »

- **Vocabulaire**

- Les saisons
- Les vacances
- La ville
- Le logement

REFERENCE BOOKS:

1. Apprenons le Français 1 & 2, New Saraswati House, 2015 |
2. A propos, A1, Langens International, 2010
3. Easy French Step-by-step by Myrna Bell Rochester-
4. Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5. À l'Aventure: An Introduction to French Language and Francophone Cultures By Evelyne Charvier-Berman, Anne C. Cummings.

Course Outcomes:

- The student will be in a position to speak in French, which is the second most widely learned foreign language after English, and the ninth most widely spoken language in the world. French is also the only language, alongside English, that is taught in every country in the world.
- The student will get the ability to speak French is an advantage on the international job market
- Students with a good level of French are eligible for French government scholarships to enroll in postgraduate courses in France in any discipline and qualify for internationally recognized French degrees.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech ,ME-II Sem

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

(R17A0005) FOREIGN LANGUAGES: GERMAN

Course Objectives:

1. To familiarize the students with a modern foreign language.
2. To familiarize the students with the sounds of German and their symbols.
3. To familiarize students with German for basic communication and functions in everyday situations.
4. To familiarize students with the basic of writing simple, direct sentences and short compositions.

SYLLABUS:

UNIT I

Current trends in German orthography, German grammar and lexical units, discourse models, oral and written.

UNIT- II

Communication patterns, prose passages, etc.

UNIT- III

Communication skills in everyday situations

UNIT-IV

Training in creative writing in German.

UNIT- V

Training in creative speaking in German.

TEXT BOOKS

1. Lernziel Deutsch

Reference books:

1. Themen
2. Tangram
3. Sprachkurs Deutsch
4. Schulz-Griesbach

Course Outcomes:

1. Students familiarize with a modern foreign language –German
2. The students with German get acquainted for basic communication in everyday situations.
3. Students will know with the basics of writing simple direct sentences and short compositions.
4. Students get to know the basics of German language to communicate in the workplace when they find the necessity.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0451) DIGITAL ELECTRONICS (OPEN ELECTIVE-I)

Course Objectives:

The main objectives of the course are:

1. To introduce basic postulates of Boolean algebra and show the correlation between Boolean expressions.
2. To introduce the methods for simplifying Boolean expressions.
3. To outline the formal procedures for the analysis and design of combinational and sequential circuits.
4. To introduce the concept of memories and programmable logic devices.
5. To illustrate the concept of synchronous and asynchronous sequential circuits.

UNIT I

BINARY SYSTEMS AND LOGIC GATES:

Binary Systems: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems,

AND, OR, NOT, NAND, NOR, Exclusive-OR, Exclusive-NOR and Exclusive-NAND implementations of Logic Functions using gates, NAND-NOR implementations.

UNIT II

MINIMIZATION TECHNIQUES:

Minimization Techniques: Boolean postulates and laws-De-Morgan's Theorem-Principle of Duality-Boolean expression-Minimization of Boolean expressions-Minterm-Maxterm-Sum of Products (SOP)-Product of Sums (POS)-Karnaugh map minimization-Don't care conditions-Quine Mc-Cluskey method of minimization.

UNIT III

COMBINATIONAL CIRCUITS:

Design Procedure-Half Adder-Full Adder-Half Subtractor-Full Subtractor-Parallel binary adder-Parallel Binary Subtractor-Multiplexer/ Demultiplexer-Decoder-Encoder.

UNIT IV

SEQUENTIAL CIRCUITS:

Latches, Flip-flops-SR, JK, D, T and Master-Slave-Characteristic table and equation-Application Table-Edge Triggering-Level Triggering-Realization of one flip-flop using other flip-flops-serial adder/subtractor-Asynchronous Counter-Asynchronous Up/Down Counter, Decade counter-Synchronous Counters-Synchronous Up/Down Counters, Decade Counters

UNIT V

MEMORY DEVICES:

Classification of Memories-ROM ROM Organization, PROM-EPROM-EEPROM-EAPROM, RAM-RAM Organization-Write operation-Read Operation-Programmable Logic Devices-

Programmable Logic Array (PLA), Programmable Array Logic (PAL)-Implementation of combinational logic circuits using ROM, PLA, PAL.

TEXT BOOK:

1. M Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India Pvt., Ltd., 2008/Pearson Education (Singapore) Pvt., Ltd., New Delhi, 2003.
2. Donald P Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.

REFERENCES:

1. John F Wakerly. "Digital Design, Fourth Edition, Pearson/PHI, 2008
2. John M Yarbrough, "Digital Logic Applications and Design", Thomson Learning, 2006
3. Charles H Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013
4. Thomas L Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011.
5. Donald D Givone, "Digital Principles and Design", TMH, 2003.

Course Outcomes:

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

- Analyse different methods used for simplification of Boolean expressions.
- Design and implement Combinational and Sequential circuits.
- Design and implement Synchronous and Asynchronous Sequential Circuits.
- Explain about memories & Programmable logic devices.
- Implement the concept of synchronous and asynchronous sequential circuits.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0251) ELEMENTS OF ELECTRICAL ENGINEERING (OPEN ELECTIVE-I)

Course Objectives:

1. To introduce the fundamental concepts of electromechanical energy conversion.
2. To familiarize the students with the principle of operation, constructional features and operational characteristics of various types of Motors used in the engineering and consumer Industry
3. To learn effect of variations of frequency and supply voltage on iron losses.
4. Able to understand maximum torque and starting torque, torque slip characteristic.
5. To learn types of Single Phase Motors & Special Machines

UNIT – I

Electromechanical Energy Conversion: Electromechanical Energy conversion – forces and torque in magnetic field systems – energy balance – energy and force in a singly excited magnetic field system, determination of magnetic force-co-energy–multi excited magnetic field systems.

UNIT – II

D.C. Generators & Motors :

D.C. Generators – Principle of operation – Action of commutator – constructional features – armature windings — simplex and multiplex windings – use of laminated armature – E. M.F Equation

D.C. Motors: Principle of operation – Back E.M.F. - Torque equation – characteristics and application of shunt, series and compound motors – Armature reaction and commutation. Speed control of DC Motors: Armature voltage and field flux control methods. Ward-Leonard system. – protective devices.

UNIT – III:

Single Phase Transformers:

Single phase transformers-principle of operation-constructional details-types-emf equation-equivalent circuit–operation on no load and on load-phasor diagrams–losses-minimization of hysteresis and eddy current losses-efficiency-all day efficiency-regulation-effect of variations of frequency and supply voltage on iron losses.

UNIT – IV:

Polyphase Induction Motors & Their Speed control

Polyphase induction motors: construction details of cage and wound rotor machines-production of a rotating magnetic field – principle of operation – rotor emf and rotor frequency–Rotor power input, rotor copper loss and mechanical power developed and their

inter relation-torque equation – expressions for maximum torque and starting torque – torque slip characteristic – double cage and deep bar rotors
Speed control: change of frequency; change of poles and methods of consequent poles; cascade connection. injection of an emf into rotor circuit (qualitative treatment only)-
induction generator-principle of operation

UNIT – V:

Single Phase Motors & Special Machines: Single phase Motors: Single phase induction motor–Constructional features–Double revolving field theory Equivalent circuit–split-phase motors - Capacitor start Capacitor run motors. Principles of A.C. Series motor-Universal motor, Stepper motor shaded pole motor, Reluctance Motors, Brushless DC motors (Qualitative Treatment only).

Text Books:

1. Electrical Machines, P.S. Bimbra, Khanna Publishers.
2. Principles of Electrical Machines, V.K. Mehta, Rohit Mehta, S. Chand Publishing.
3. Electric Machines by I.J. Nagrath & D.P. Kothari, Tata McGraw–Hill Publishers.

Reference Books:

1. Electric Machines, Mulukutla S. Sarma, Mukesh K. Pathak, Cengage Learning.
2. Fundamentals of Electric Machines, B.R. Gupta, Vandana Singhal, New Age International Publishers.
3. Electric machinery–A.E. Fitzgerald, C. Kingsley and S. Umans, McGraw Hill Companies, 5th edition.
4. Theory of Alternating Current Machinery-by Langsdorf, Tata McGraw-Hill Companies, 2nd edition

Course Outcomes:

At the end of the course the student will

- Have a clear understanding of the materials used and features in the construction of the electrical machines like transformers, DC and AC motors and special purpose motors.
- Acquire a basic knowledge on the principle of operation of all these machines
- Have a basic knowledge on the Torque speed relations and the effect of load torque on their performance.
- Will have fundamental concept on the speed control of the various types of motors.
- Acquire a basic knowledge Polyphase Induction Motors & Their Speed control

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0551) DATA BASE SYSTEMS (OPEN ELECTIVE -I)

Course Objectives:

- To understand the basic concepts and the applications of database systems
- To Master the basics of SQL and construct queries using SQL
- To understand the relational database design principles
- To become familiar with the basic issues of transaction processing and concurrency control
- To become familiar with database storage structures and access techniques

UNIT I: INTRODUCTION

Data- Database: File Processing System Vs DBMS, History, Characteristic-Three schema Architecture of a database, Functional components of a DBMS. DBMS Languages-Database users and DBA.

UNIT II: DATABASE DESIGN

ER Model: Objects, Attributes and its Type. Entity set and Relationship set-Design Issues of ER model-Constraints. Keys-primary key, Super key, candidate keys. Introduction to relational model-Tabular, Representation of Various ER Schemas. ER Diagram Notations-Goals of ER Diagram- Weak Entity Set- Views.

UNIT III: STRUCTURED QUERY LANGUAGE

SQL: Overview, The Form of Basic SQL Query -UNION, INTERSECT, and EXCEPT- join operations: equi join and non equi join-Nested queries - correlated and uncorrelated-Aggregate Functions-Null values.

UNIT IV - DEPENDENCIES AND NORMAL FORMS

Importance of a good schema design,- Problems encountered with bad schema designs, Motivation for normal forms- functional dependencies, -Armstrong's axioms for FD's-Closure of a set of FD's,- Minimal covers-Definitions of 1NF,2NF, 3NF and BCNF-Decompositions and desirable properties -

UNIT V:

Transactions: Transaction concept, transaction state, System log, Commit point, Desirable Properties of a Transaction, concurrent executions, serializability, recoverability, implementation of isolation, transaction definition in SQL, Testing for serializability ,Serializability by Locks-Locking Systems with Several Lock Modes-Concurrency Control by Timestamps, validation.

TEXT BOOK:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, " Database System Concepts", McGraw-Hill, 6th Edition ,2010.
2. Fundamental of Database Systems, by Elmasri, Navathe, Somayajulu, and Gupta, Pearson Education.

REFERENCES:

1. Raghu Ramakrishnan, Johannes Gehrke, "Database Management System", McGraw Hill., 3rd Edition 2007.
2. Elmasri & Navathe, "Fundamentals of Database System," Addison-Wesley Publishing, 5th Edition, 2008.
3. Date. C.J, "An Introduction to Database", Addison-Wesley Pub Co, 8th Edition, 2006.
4. Peter Rob, Carlos Coronel, "Database Systems – Design, Implementation, and Management", 9th Edition, Thomson Learning, 2009.

Course Outcomes:

- Ability to identify the data models for relevant problems.
- Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respective data.
- Ability to explain issues of transaction processing and concurrency control.
- Ability to select the database storage structures and access techniques.
- Demonstrate the basic elements of a relational database management system.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0351) ELEMENTS OF MECHANICAL ENGINEERING (OPEN ELECTIVE -I)

Course Objectives:

- To give an insight to students about the behavior of materials under external forces.
- The concept of stress, strain, elasticity etc. as applied to various structures under loading are included.
- The student able to learn about concept of fluids, turbines and engines.
- To give an insight to students about the Internal combustion engines.
- The student able to learn about concept of the different types of transmission systems.

UNIT – I

Stresses and strains: kinds of – stress-strains, elasticity and plasticity, Hooks law, stress – strain diagrams, modules of elasticity, Poisson’s ratio, linear and volumetric strain, relation between E, N, and K, bars of uniform strength, compound bars and temperature stresses.

UNIT – II

Engineering Materials and Joining Processes:

Engineering Materials: Types and applications of nonferrous metals and alloys

Composites: Introduction, Definition, Classification and applications (Air Craft and Automobiles)

Soldering, Brazing and Welding:

Definitions, Classification and method of soldering, Brazing and welding. Difference between Soldering, Brazing and Welding. Description of electric Arc Welding and Oxy-Acetylene Welding

UNIT – III

Properties of Fluid : Stream line , streak line , path line , continuity equation pipes are in series, pipes are in parallel, HGL, TGL , Bernoulli’s equation.

Hydraulic pumps and turbines: working principles and velocity diagrams.

UNIT – IV

Internal combustion engines: classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, simple problems such as indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical efficiency.

UNIT - V

Belts - Ropes and chain: belt and rope drives, velocity ratio, slip, length of belt , open belt and cross belt drives, ratio of friction tensions, centrifugal tension in a belt, power transmitted by belts and ropes, initial tensions in the belt, simple problems.

Gear trains: classification of gears, gear trains velocity ratio, simple, compound –reverted and epicyclic gear trains.

TEXT BOOKS:

1. Strength of Materials, R.K. Bansal, S.ChandPublications
2. Thermal Engineering, Ballaney,P.L., Khanna Publishers, 2003.
3. Theory of Machines, S.S. Rattan , Tata McGrawHill.
4. Fluid Mechanics and Hydraulic Machinery R.K. Bansal.

REFERENCE BOOKS:

1. Thermal Engineering, R.K. Rajput , Laxmi Publications.
2. TheoryofMachines,R.S.Khurmi,S.ChandPublications.
3. FluidMechanicsandHydraulicMachinery,Modi&Seth.
4. Manufacturing Technology,P.N.Rao.

Course Outcomes:

- The student would be exposed to basic mechanical engineeringmachinery.
- The student learned about mechanicalcomponents.
- Students understand about engines andturbines.
- The student learned about Belts - Ropes and chain in transmissionsystems.
- Students understand about engines Properties of Fluid, Hydraulic pumps andturbines.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0352) GREEN ENERGY SYSTEMS (OPEN ELECTIVE -I)

Course Objectives:

- The course aims to highlight the significance of alternative sources of energy.
- Green energy systems and processes and provides the theory and working principles of probable sources of renewable and green energy systems that are environmental friendly.
- Will be able to learn Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas.
- Will be able to learn concepts of solar radiation, solar energy collection methods.
- Will be able to learn concepts of solar energy storage and applications.

UNIT-I

Introduction:

Solar Radiation: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells, I-V characteristics.

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, solar cookers, central power tower concept and solar chimney.

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.

UNIT – III

Bio-Mass: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT –IV

Energy Efficient Systems: Electrical Systems: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation and air conditioning), demand site management.

Mechanical Systems: Fuel cells- principle, thermodynamic aspects, selection of fuels & working of various types of fuel cells, Environmental friendly and Energy efficient compressors and pumps.

UNIT-V

Energy Efficient Processes: Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmental friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.

TEXT BOOKS:

- Sukhatme S.P. and J.K. Nayak, Solar Energy – Principles of Thermal Collection and Storage, TMH.
- Khan B.H., Non-Conventional Energy Resources, Tata McGraw Hill, New Delhi, 2006.
- Green Manufacturing Processes and Systems, Edited by J. Paulo Davim, Springer 2013.

REFERENCES:

- Alternative Building Materials and Technologies / K.S. Jagadeesh, B.V. Venkata Rama Reddy and K.S. Nanjunda Ra.
- Principles of Solar Energy / Frank Krieth & John F. Kreider.
- Non-Conventional Energy / Ashok V. Desai / Wiley Eastern.
- Renewable Energy Technologies / Ramesh & Kumar / Narosa
- Renewable Energy Technologies / G.D. Roy

Course Outcomes:

- The students shall understand the principles and working of solar, wind, biomass, geothermal, ocean energies.
- Green energy systems and appreciate their significance in view of their importance in the current scenario and their potential future applications.
- Types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for.
- Learn concepts of Fuel cells- principle, thermodynamic aspects.
- Learn different types of energy efficient processes.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

II Year B. Tech, ME-II Sem

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

(R17A0051) INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE -I)

Course Objectives:

- Create an understanding on Intellectual Properties and the importance of it.
- To understand various agreements on IPR internationally.
- Create awareness on the protection of Intellectual property rights.
- Understand the issues and legal systems of Intellectual Property Internationally.
- To create awareness on Licensing and Transferring the intellectual property rights, understand the process of agreements for the transfer.
- Understand various organizations for IPR like WTO, GATT.

Unit-I

Introduction: Intellectual property rights basics, the role and value of IP in international commerce, Issues affecting IP internationally. Agreement on trade related aspects of Intellectual Property Rights. (TRIPS) - Agreement on TRIPS and India.

Unit-II

Parties to IP Rights: Owner, customer, authorized user, licensee, attorney, protection of the weak and strong, finalizing ownership and user rights.

Unit-III

Ensuring the value of IP: Ensuring the value of IP at creation stage, after creation stage, precise contractual protection of IP rights. Key issues related to IP internationally. IP rights in international forums. Fundamentals in Country legal systems, generalities. Validity of IP rights locally: specifics.

Unit-IV

Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, work made for hire agreement - Protecting IP Rights: non disclosure agreement, cease and desist letter, settlement memorandum. Transferring IP Rights: assignment contract, license agreement, deed of assignment or license agreement, addendum to unrecorded assignment or license.

Unit-V: Remedies and IPR Evaluation - GATT - WTO - Role of WTO in solving IPR issues.

REFERENCES:

- A short course in International Intellectual Property Rights – Karla C. Shippey, World Trade Press – 2nd Edition.
- Intellectual Property Rights – Heritage, Science, & Society under international treaties – A. Subbian, - Deep & Deep Publications – New Delhi.
- Intellectual Property Rights: N K Acharya: ISBN:9381849309
- Intellectual Property Rights: C B Raju :ISBN-8183870341

- Intellectual Property : Examples and Explanation – Stephen M Mcjohn, 2.e, ISBN-13:978-0735556652
- Intellectual Property Rights in the Global Economy – Keith E Maskus, PIIE, ISBN paper 0-88132-282-2

Course Outcomes:

- It allows students how to prepare and protect the Inventions ,start up ideas and rights of patents and copy rightsetc.,
- Students gets the knowledge onTRIPS.
- This subject brings awareness to the students the basic legal aspects at present following at Globallevel.
- Student gets the exposure of license agreement legal systems andgeneralities.
- Student gets exposure to licensing and transfer of intellectual property and the agreements based ontransfer.
- Summarize the Intellectual property rights and analyze various organizations like WTO,GATTetc,

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-ISem

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

(R17A0312) ADVANCED THERMAL ENGINEERING

Course Objectives:

- Applications and the principles of thermodynamics to components and systems.
- The purpose of this course is to enable the student to gain an understanding of how thermodynamic principles govern the behavior of various systems
- Student have knowledge of methods of analysis and design of complicated thermodynamic systems
- Acquires knowledge about thermodynamic analysis for steam nozzles.
- Acquires knowledge on condensers and steam turbines.

UNIT-I

Boilers: Classification-Working principles with sketches including H.P. Boilers-Mountings and Accessories - Working principle.

Steam Condensers: Requirements of steam condensing plant - Classification of condensers - Working principle of different types.

UNIT-II

Basic Concepts: Rankine cycle - Schematic layout, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance-Regeneration & reheating.

Steam Nozzles: Function of nozzle-Applications and Types-Flow through nozzles- Thermodynamic analysis.

UNIT-III

Steam Turbines: Classification - Impulse turbine; Mechanical details - Velocity diagram - Effect of friction - Power developed, Axial thrust, Blade or diagram efficiency - Condition for maximum efficiency.

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-IV

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.

UNIT-V

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-Turbojet engines-Needs and Demands met by Turbojet-

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

TEXT BOOKS:

1. Thermal Engineering / Rajput / Lakshmi Publications.
2. Gas Turbines / V. Ganesan /TMH.
3. Thermal Engineering /P.L. Ballaney / Khanna Publishers,NewDelhi.

REFERENCE BOOKS:

1. GasTurbinesandPropulsiveSystems/P.Khajuria&S.P.Dubey/DhanapatraiPub.
2. Thermal Engineering / R.S. Khurmi&J.K. Gupta / S. ChandPub.
3. Thermodynamics and Heat Engines / R. Yadav / Central BookDepot

Course Outcomes:

- Recognize and recall the importance of thermal power plant and its thermodynamic analysis for improvement of efficiency.
- Understand the operation of steam boiler, steam nozzle, condenser and steam turbine.
- Able to do thermodynamic analysis for steam nozzles, condensers and steam turbines.
- Evaluate the thermodynamic efficiency of gas turbine and jet propulsion systems.
- Create the jet propulsion system and do the thermodynamic analysis for better efficiency.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-I Sem

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

(R17A0313) MACHINE DESIGN-I

NOTE: Design Data Book is permitted. Design of all components should include design for strength and rigidity apart from engineering performance requirements.

Course objectives:

- The students should be able to understand. Types of loading on machine elements and allowable stresses. To apply different materials of construction and their properties and factors determining the selection of material for various applications
- To understand Stress concentration and the factors responsible. Determination of stress concentration factor; experimental and theoretical methods. • Fatigue strength reduction factor and notch sensitivity factor.
- To develop the Knowledge on Basic failure mechanisms of riveted joints. Concepts of design of a riveted joint, welded joints and Bolted Joints to determine the forces in welds and riveted joints and formulate design solution for size of weld and size of rivet
- To learn the design Procedure for the different machine elements such as fasteners, couplings, keys, axially loaded joint etc.
- To learn the design Procedure for the different Shafts under loading condition, able to know various shaft coupling.

UNIT – I

INTRODUCTION: General considerations in the design of Engineering Materials and their properties – selection – Manufacturing consideration in design. BIS codes of steels.

DESIGN FOR STATIC STRENGTH: Simple stresses – Combined stresses – Torsional and Bending 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

DESIGN FOR FATIGUE STRENGTH : Stress concentration – Theoretical stress Concentration factor – Fatigue stress concentration factor- Notch Sensitivity – Design for fluctuating stresses – Endurance limit – Estimation of Endurance strength – Gerber’s curve, Goodman’s line – Modified Goodman’s line – Soderberg’s line.

UNIT – III

RIVETED, WELDED AND BOLTED JOINTS:

Riveted joints- Methods of failure of riveted joints-strength equations-efficiency of riveted joints-eccentrically loaded riveted joints.

Welded joints -Design of fillet welds-axial loads-circular fillet welds under bending, torsion. Welded joints under eccentric loading.

Bolted joints – Design of bolts with pre-stresses – Design of joints under eccentric loading – locking devices – bolts of uniform strength.

UNIT – IV

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

SHAFTS :Design of solid and hollow shafts for strength and rigidity – Design of shafts for combined bending and axial loads – Shaft sizes – BIS code. Use of internal and external circlips, Gaskets and seals (stationary&rotary).

SHAFT COUPLINGS :Rigid couplings – Muff, Split muff and Flange couplings. Flexible couplings – Flange coupling (Modified).

TEXT BOOKS:

1. Machine Design by R.S.Khurmi and J.K.Gupta, S.ChandPublishers,NewDelhi.
2. Machine Design, S MD Jalaludin, AnuradhaPublishers.
3. Design of Machine Elements by V. BhandariTMH

REFERENCE BOOKS:

1. Machine Design Data Book by S MD Jalaludin, AnuradhaPublishers
2. Machine Design Data Book by P.S.G. College ofTechnology
3. Machine Design by Pandya and Shah, ChortarPublications.
4. Machine Design / R.N.Norton
5. Mechanical Engineering Design / JEShigley.

Course Outcomes:

Student will be able to:

- Acquires the knowledge about the principles of design, material selection, component behavior subjected to loads, and criteria of failure.
- Understands the concepts of principal stresses, stress concentration in machine members and fatigue loading. Analyze the fluctuating loads that will cause failure in real parts using the Soderberg, Gerber and Goodman techniques.
- Understand different welded and riveted joints structure and able to apply its knowledge to analyze its strength when subjected to simple, coplanar and eccentric loading
- Explain and design the basic of mechanical design process of simple machine components like, key, cotter joints and coupling.
- Design the solid, hollow shafts and find the critical speeds

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-I Sem

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

(R17A0314) MACHINE TOOLS

Course Objectives:

- Learn about the geometry of metal cutting theory, mechanism of chip formation and mechanics of orthogonal cutting and merchant's force diagram.
- Gain the knowledge and features, working principles and applications of lathe, shaper, planer, slotter, milling, drilling, and machines.
- Learn about the ways to reduce the surface roughness by using different Machining processes.
- To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.
- Understanding of the latest technologies being used in manufacturing industries as part of modernization of industries

UNIT-I

Metal cutting theory: Elements 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.

UNIT-II

Lathe Machine: Principle of working, specification of lathe and types of lathes, operations of lathe and work holding and tool holding devices. CNC Machine Elements- Machine structure- Tooling for CNC Machines-Interchangeable tooling system and qualified tools, coolant fed tooling system, quick change tooling system, automatic head changers.

UNIT-III

Shaping, slotting and planing machines: -Principles of working – classifications, operations performed, machining time calculations. Drilling and specifications, types, operations performed – tool holding devices – twist drill –Deep hole drilling machine.

UNIT-IV

CNC Milling Machine: Principles of working – classifications of CNC milling machines– operations-milling cutters. Grinding machines–classifications–Different types of abrasives and bonds and selection of a grinding wheel.

UNIT-V

Modern Machining Processes:

Need for Non-Traditional machining methods, Types-AJM, WJM, ECM, EDM, USM. Material Removal Rate (MRR), Selection of tools and dielectric fluid, process variables. Plasma Machining and its applications. Applications and limitations.

TEXT BOOKS:

1. Production Technology by R.K. Jain and S.C. Gupta, Khanna Publications
2. Production Technology by H.M.T. (Hindustan Machine Tools). handbook
3. Production Technology by P.C. Sharma, S Chand publication
4. Modern Machining Process / Pandey P.C. and Shah H.S./ TMH Publishers

REFERENCE BOOKS:

1. Machine Tools – C Elanchezian and M. Vijayan, Anuradha Publications
2. Workshop Technology – B.S. Raghu Vamshi – Vol II, Dhanpatra publications
3. Manufacturing Technology by P.N. Rao, Volume II, McGraw Hill
4. Advanced machining processes/ VK Jain/ Allied publishers.

Course Outcomes:

- Understand the fundamentals of metal cutting, chip formation, cutting forces involved in orthogonal metal cutting, and different cutting forces will be learned.
- Analyze the classification of lathe, shaper, planer, slotter, milling, drilling, and machines.
- Evaluate the surface finishing operations with abrasive processes such as Grinding and broaching machines, types and working principle.
- Select appropriate machining processes and conditions for different metals.
- Understand the knowledge needed for unconventional machining processes and are able to apply these concepts in academic research.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-I Sem

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

(R17A0315) METROLOGY AND SURFACE ENGINEERING

Course Objectives:

- Summarize the basics knowledge of Measurements, and measuring devices.
- Relate Linear Measurements which includes concepts of various measurement systems & standards with regards to realistic applications
- Explaining different principles of optical and flat Measuring Instruments and their application in industries
- Evaluation and inspection of surface roughness.
- understand the concepts of gears, screw threads and CMM to evaluate machine tool quality

UNIT-I

System 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 and screwed work.

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.

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

UNIT-III

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

Flat Surface Measurement: Measurement of flat surfaces – instruments used – straight edges – surface plates – optical flat and auto collimator.

UNIT-IV

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-V

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.

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

TEXT BOOKS:

1. Engineering Metrology / I C Gupta./DanpathRai
2. Engineering Metrology / R.K. Jain / KhannaPublishers
3. HandbookofTribology:Materials,Coating,andSurfaceTreatments/Bharat Bhushan andB.K.Gupta.

REFERENCE BOOKS:

1. BIS standards on Limits & Fits, Surface Finish, Machine Tool Alignmentetc.
2. Fundamentals of Dimensional Metrology 4e / Connie Dotson /Thomson
3. SurfaceEngineeringforcorrosionandwearresistance/JRDavis/WoodheadPublishers.

CourseOutcomes:

- Exploreknowledge&abilitytodesigntolerancesandfitsforselectedproductquality.
- DemonstrateknowledgewithLinearMeasurement,MeasurementofAnglesandTapers and LimitGauges.
- UnderstandPrinciplesofOptical&FlatSurfacemeasuringinstruments,gaugesandtheir uses.
- ExploretheuseofappropriatemethodfordeterminationofSurfaceRoughness Measurement by using differentparameters.
- Theycanchooseappropriatemethodandinstrumentsforinspectionofvariousgear elements and thread elements with the help ofcomparators

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-I Sem

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

(R17A0316) COMPUTER INTEGRATED MANUFACTURING (CORE ELECTIVE – I)

Course Objectives:

- This course will enable the student to gain knowledge about the basic fundamentals of CAD.
- To gain knowledge on how computers are integrated at various levels of planning and manufacturing.
- To understand computer aided planning and control and computer monitoring.
- To understand APT and CNC programming concepts.
- To know about tooling for CNC machines.

UNIT – I

Computer-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 - II

Tooling for CNC Machines: Interchangeable tooling system, preset and qualified tools, coolant fed tooling system, modular featuring, quick change tooling system, automatic head changers. 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 processes like turning, grinding.

UNIT - III

Post Processors for CNC: Introduction to Post Processors: The necessity of a Post Processor, the general structure of a Post Processor, the functions of a Post Processor, DAPP — based-Post Processor: Communication channels and major variables in the DAPP — based Post Processor, the creation of a DAPP — Based Post Processor.

UNIT – IV

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, principle of

operations, Programming mnemonics timers, Internal relays and counters, Applications of PLC's in CNC Machines.

UNIT - V

Computer Aided Process Planning: Hybrid CAAP System, Computer Aided Inspection and quality control, Coordinate Measuring Machine, Limitations of CMM, Computer Aided Testing, Optical Inspection Methods, Artificial Intelligence and expert system: Artificial Neural Networks, Artificial Intelligence in CAD, Experts systems and its structures.

TEXT BOOKS

1. Computer Control of Manufacturing Systems / Yoram Koren / Mc Graw Hill.1983.
2. Computer Aided Design Manufacturing - K. Lalit Narayan, K. MallikarjunaRao and M.M.M. Sarcar, PHI,2008.
3. CAD/CAM Principles and Applications, P.N.Rao,TMH

REFERENCES

1. CAD / CAM Theory and Practice,/ IbrahimZeid,TMH
2. CAD / CAM / CIM, Radhakrishnan and Subramanian, NewAge
3. Principles of Computer Aided Design and Manufacturing, Farid Amirouche,Pearson
4. Computer Numerical Control Concepts and programming, Warren S Seames,Thomson.

Course Outcomes:

- Acquire knowledge on components of computer integrated manufacturing.
- Students should be able to understand business functions those influence design of a particular product.
- Students should be able to know function of computer in design and manufacturing.
- Students should be able to understand the function of microcontrollers and PLCs.
- Apply Computer aided process planning, MRP and CNC part programming.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-I Sem

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

(R17A0317) INNOVATION AND DESIGN THINKING (CORE ELECTIVE – I)

Course Objectives:

The objective of this subject is to provide knowledge of Innovation and Design Thinking

- Understand the conceptual development techniques to find solution for a critical design issue.
- Understand Principles to translate the conceptual ideas to engineering design.
- Understand Principles of Design for Manufacturing and Assembly.
- To know about the design for assembly principles
- To know about the design for environment and design for recycling

UNIT-I

Introduction: Innovations in Design, Engineering Design Process, Prescriptive and integrative models of design, Design Review and societal considerations.

Identification of Customer Need: Evaluating Customer requirements and survey on customer needs, Conversion of customer needs into technical Specifications, Information sources.

UNIT-II

Theory of Inventive Problem solving (TRIZ), Creativity and Problem solving, Functional Decomposition of the problem for innovative concept development, Introduction to Axiomatic Design, Concept evaluation and decision making.

UNIT-III

Design for Manufacturing: Technical estimating, design of experiments, design for manufacturability, statistical process control, Introduction to FMEA (failure modes and effects analysis), and Case study of design for manufacturing: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-IV

Design for Assembly: Assembly Principles, Process, Worksheet, Assumptions.

Case study of design for Assembly: Manufacturing System Design Based on Axiomatic Design: Case of Assembly Line

UNIT-V

Design for Environment: Design for recycling; Design for disassembly, Design for energy Efficiency, Design for remanufacture, Design for disposability, Hazardous material minimization. Case study of design for Environment.

TEXT BOOKS:

1. Nigel Cross, Engineering Design Methods, John Wiley, 2009.
2. George E. Dieter, Engineering Design, McGraw-Hill, 2009.
3. Genrich Altshuller, The Innovation Algorithm, Technical Innovation Centre, 2011.

REFERENCE BOOKS

1. [The Art of Innovation](#), by Tom Kelley.
2. [Design Thinking](#), by Nigel Cross.
3. [The Design of Business](#): by Roger Martin.

Course Outcomes:

- The importance of design in innovation.
- Design tools and processes can generate innovative new ideas.
- Design and design thinking to innovative in areas such as engineering, software development and business operations.
- Strengthen students' individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment.
- To describe the various case studies for design for environment.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-I Sem

L T/P/D C

3 0 3

(R17A0318) COMBUSTION TECHNOLOGY (CORE ELECTIVE – I)

Course Objectives:

- To make students familiar with the design and operating characteristics of modern internal combustion engines.
- To apply analytical techniques to the engineering problems and performance analysis of internal combustion engines.
- To study the thermodynamics, combustion, heat transfer, friction and other factors affecting engine power, efficiency and emissions.
- To introduce students to the environmental and fuel economy challenges facing the internal combustion engine.
- To introduce students to future internal combustion engine technology and market trends.

UNIT-I

Solid Fuel: Classification of fuel, Origin, Composition, Characteristics and analysis of coal washing & storage of coal, Physical & chemical processing of coal, Various classification systems of coal briquetting, Carbonization, Gasification of coal. **Liquid Fuel:** Origin, Composition and classification, Properties, Chemical processing – Cracking, Reforming, Polymerization, Alkylation and Isomerization. **Gaseous Fuel:** Classification of gaseous fuel, Natural gas, LPG, Refinery gas, Producer gas, Water gas.

UNIT-II

Fuel Combustion Calculation: Fundamentals of various combustion calculations with numerical examples.

UNIT-III

Combustion Process: General Principles of combustion, Flame, Draught, Limits of Inflammability, Types of combustion Process- Surface, Submerged, Pulsating, Slow combustion.

UNIT-IV

Energy Conservation: Energy consumption pattern in various sectors, various ways of energy conservation in various process industries including petroleum.

UNIT-V

Non – Conventional Energy Technologies: General principles with applications and technology of Biomass Energy, Solar Energy, Geothermal Energy, Wind Energy, Nuclear Energy, Hydal, Tidal and Ocean Energy.

TEXT BOOKS:

1. Fuel combustion Energy Technology by S.N. Saha ,Dhanpat Rai Publication Co.Pvt. Ltd. NewDelhi
2. Combustion Engineering by A. K. Sarkar, New AgeInternational
3. Lean Combustion: Technology and Control 1st Edition by DerekDunn-Rankin.

REFERENCE BOOKS:

1. Green Energy Technology by MariaCarvalho
2. FundamentalsofCombustionProcesses(MechanicalEngineeringSeries)byKarenverson
3. FundamentalsofCombustionProcessesAuthors:McAllister,Sara,Chen,Jyh-Yuan, Fernandez-Pello, A.craloeo

Course Outcomes:

- Recognize and understand reasons for differences among operating characteristics of different engine types and designs.
- Given an engine design specification, predict performance and fuel economy trends with good accuracy.
- Based on an in-depth analysis of the combustion process, predict concentrations of primary exhaust pollutants.
- Exposure to the engineering systems needed to set-up and run engines in controlled laboratory environments.
- Develop skills to run engine dynamometer experiments.



OPEN ELECTIVES II

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. I Sem

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

**OPEN ELECTIVE II
(R17A0452) INDUSTRIAL ELECTRONICS**

Course Objectives:

1. To get an overview of semi-conductor devices (such as PN junction diode & Transistor) and their switching characteristics.
2. To understand the characteristics of AC to DC converters.
3. To understand about the practical applications of Electronics in industries.
4. To understand different types of Resistance welding controls.
5. To get an overview of ultrasonics.

UNIT I

Scope of industrial Electronics, Semiconductors, Merits of semiconductors, crystalline structure, Intrinsic semiconductors, Extrinsic semiconductors, current flow in semiconductor, Open-circuited p-n junction, Diode resistance, Zener diode, Photoconductors and junction photo diodes, Photo voltaic effect, Light emitting diodes (LED)

UNIT II

Introduction, The junction transistor, Conventions for polarities of voltages and currents, Open circuited transistor, Transistor biased in the active region, Current components in transistors, Currents in a transistor, Emitter efficiency, Transport factor and transistor- α , Dynamic emitter resistance, Transistor as an amplifier, Transistor construction, Letter symbols for semiconductor Devices, Characteristic curves of junction transistor in common configuration, static characteristic curves of PNP junction transistor in common emitter configuration, The transistor in common collector Configuration.

UNIT III

AC to DC converters- Introduction, Classification of Rectifiers, Half wave Rectifiers, Full wave Rectifiers, Comparison of Half wave and full wave rectifiers, Bridge Rectifiers, Bridge Rectifier meter, Voltage multiplying Rectifier circuits, Capacitor filter, LC Filter, Metal Rectifiers, Regulated Power Supplies, Classification of Voltage Regulators, Short period Accuracy of Regulators, Long period Accuracy of Voltage Regulator, Principle of automatic voltage Regulator, Simple D.C. Voltage stabilizer using Zener diode, D.C. Voltage Regulators, Series Voltage Regulators, Complete series voltage regulator circuit, Simple series voltage regulator.

UNIT IV

Resistance welding controls: Introduction, Resistance welding process, Basic Circuit for A.C. resistance welding, Types of Resistance welding, Electronic welding control used in Resistance welding, Energy storage welding. **Induction heating:** Principle of induction heating, Theory of Induction heating merits of induction heating, Application of induction heating, High frequency power source of induction heating. **Dielectric heating:** Principle of dielectric heating, theory of dielectric heating, dielectric properties of typical materials, electrodes used in dielectric heating, method of coupling of electrodes to the R.F. generator, Thermal losses in Dielectric heating, Applications.

UNIT V :

Ultrasonics: Introduction, Generation of Ultrasonic waves, Application of Ultrasonic waves, Ultrasonic stroboscope, ultrasonic as means of communication, ultrasonic flaw detection,

Optical image on non-homogeneities, ultrasonic study of structure of matter, Dispersive study of structure of matter, Dispersive and colloidal effect of Ultrasonic, Coagulating action of Ultrasonic, separation of mixtures by ultrasonic waves, cutting and machining of hard materials by ultrasonic vibrations, Degassing of liquids by ultrasonic waves, Physico-chemical effects of ultrasonics, chemical effects of ultrasonics, Thermal effects of Ultrasonics, soldering and welding by ultrasonics, Ultrasonic Drying

TEXT BOOKS:

1. G. K. Mithal, "Industrial Electronics", Khanna Publishers, Delhi, 2000.
2. J. Gnanavadeivel, R. Dhanasekaran, P. Maruthupandi, "Industrial Electronics", Anuradha Publications, 2011.

REFERENCE BOOKS:

1. F. D. Petruzella, "Industrial Electronics", McGraw Hill, Singapore, 1996.
2. M. H. Rashid, "Power Electronics Circuits, Devices and Application", PHI, 3rd edition, 2004.
3. G. M. Chute and R. D. Chute, "Electronics in Industry", McGraw Hill Ltd, Tokyo, 1995.

Course Outcomes:

After completion of the course the students will be able to

1. Get an overview of semi-conductor devices (such as PN junction diode & Transistor) and their switching characteristics.
2. Understand the characteristics of AC to DC converters.
3. Understand about the practical applications of Electronics in industries.
4. Understand about the resistance welding process, resistance welding, electronic welding control used in resistance welding.
5. Get an overview of Physico-chemical effects of ultrasonics, chemical effects of ultrasonics.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. I Sem

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

OPEN ELECTIVE II (R17A0453) COMMUNICATION NETWORKS

Course Objectives:

1. To understand the concept of computer communication.
2. To learn about the networking concept, layered protocols.
3. To understand various communication concepts.
4. To get the knowledge of various networking equipment.

UNIT – I: Overview of Computer Communications and Networking: Introduction to Computer Communications and Networking, Introduction to Computer Network, Types of Computer Networks, Network Addressing, Routing, Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT – II: Essential Terms and Concepts: Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications, Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT – III: Analog and Digital Communication Concepts: Representing data as analog signals, representing data as digital signals, data rate and bandwidth reduction, Digital Carrier Systems.

UNIT – IV: Physical and Data Link Layer Concepts: The Physical and Electrical Characteristics of wire, copper media, fiber optic media, Wireless communications. Introduction to data link layer, logical link control and medium access control sub-layers.

UNIT – V: Network Hardware Components: Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PC cards, bridges, switches, Switches vs Routers.

TEXT BOOKS:

1. Computer Communications and Networking Technologies, Michel A. Gallo and William H. Hancock, Thomson Brooks/Cole.
2. Data Communications and Networking – Behrouz A Forouzan, Fourth Edition, McGraw Hill Education, 2006.

REFERENCE BOOKS:

1. Principles of Computer Networks and Communications, M Barry Dumas, Morris Schwartz, Pearson.
2. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K W Ross, 3rd Edition, Pearson Education.

Course Outcomes:

1. The student can get the knowledge of networking of computers, data transmission between computers.
2. Will have the exposure about the various communication concepts.
3. Will get awareness about the structure and equipment of computer network structures.
4. Will get awareness about physical and data link layer concepts.
5. Will get awareness about network hardware components

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. I Sem

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

OPEN ELECTIVE II

(R17A0552) INTRODUCTION TO JAVA PROGRAMMING

Course Objectives:

This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, students should be able

- 1) to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism;
- 2) use data types, arrays and strings;
- 3) implement error-handling techniques using exception handling,
- 4) create and event-driven GUI using AWT components.
- 5) Demonstrate the ability to employ various types of selection constructs in a Java program. Be able to employ a hierarchy of Java classes to provide a solution to a given set of requirements

UNIT I: OOP Concepts: Data abstraction, encapsulation, inheritance, Polymorphism, classes and objects, Procedural and object oriented programming paradigms.

Java Basics History of Java, Java buzzwords, data types, variables, constants, scope and life time of variables, operators, expressions, control statements, type conversion and casting, simple java programs, concepts of classes, objects, arrays, strings, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, BufferedReader class, Scanner class, StringTokenizer class, inner class.

UNIT II: Inheritance – Types of Inheritance, super keyword, and preventing inheritance: final classes and methods.

Polymorphism – Dynamic binding, method overriding, abstract classes and methods.

Interfaces- Interfaces Vs Abstract classes, defining an interface, implement interfaces, extending interface.

Packages- Defining, creating and accessing a package, importing packages.

UNIT III: Exception handling - Concepts of exception handling, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, checked exceptions and unchecked exceptions, built in exceptions.

Multi threading: Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, inter thread communication.

UNIT IV: Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

Event Handling: Events, Handling mouse and keyboard events, Adapter classes.

Files- Streams- Byte streams, Character streams, Text input/output.

UNIT V: GUI Programming with Java – AWT class hierarchy, component, container, panel, window, frame, graphics.

AWT controls: Labels, button, text field, check box, and graphics.

Layout Manager – Layout manager types: border, grid and flow.

Swing – Introduction, limitations of AWT, Swing vs AWT.

TEXT BOOKS:

1. Java- the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson education.

3. Core Java an integrated approach, dreamtech publication, Dr. R.Nageswara Rao.

REFERENCE BOOKS:

1. Java for Programmers, P.J.Deitel and H.M.Deitel, PEA (or) Java: How to Program , P.J.Deitel and H.M.Deitel, PHI
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, PE
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Universities Press.

Course Outcomes:

- An understanding of the principles and practice of object oriented programming and design in the construction of robust, maintainable programs which satisfy their requirements;
- A competence to design, write, compile, test and execute straightforward programs using a high level language;
- An appreciation of the principles of object oriented programming;
- An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Be able to make use of members of classes found in the Java API.
- Able to develop applications using Applet, awt and GUI Programming.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. I Sem

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

OPEN ELECTIVE II

(R17A0551) INTRODUCTION TO SCRIPTING LANGUAGE

Course Objectives:

- Learning the basics of scripting languages like PERL, JAVASCRIPT, PYTHON
- Understanding the requirements and uses of Scripting.
- In-depth knowledge of programming features of Perl and Python.
- Knowing the implementation model for scripting and design of applications.

UNIT I

Introduction to PERL and Scripting Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT II

HTML: HTML basics, Elements, Attributes and Tags, Basic Tags, Advanced Tags, Frames, Images.

Cascading style sheets: Adding CSS, CSS and page layout.

JavaScript: Introduction, Variables, Literals, Operators, Control structure, Conditional statements, Arrays, Functions, Objects, Predefined objects, Object hierarchy, Accessing objects.

UNIT III

JavaScript programming of reactive web pages elements: Events, Event handlers, multiple windows and Frames, Form object and Element, Advanced JavaScript and HTML, Data entry and Validation, Tables and Forms.

Introduction to Python Programming: History of Python, Need of Python Programming, Running Python Scripts, Variables, Assignment, Keywords, Input-Output, Indentation, Types - Integers, Strings, Booleans.

UNIT IV

Operators and Expressions: Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations.

Data Structures: Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences.

UNIT V

Control Flow - if, if-else, for, while, break, continue, pass

Functions - Defining Functions, Calling Functions, Passing Arguments, Default Arguments, Variable-length arguments, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Development of sample scripts and web applications.

TEXT BOOKS:

1. The World of Scripting Languages, David Barron, Wiley Publications.
2. Learning Python, Mark Lutz, Orielly
3. Web Programming, building internet applications, Chris Bates 2nd Edition, WILEY
4. Beginning JavaScript with DOM scripting and AJAX, Russ Ferguson, Christian Heilmann, Apress.

5. Python Web Programming, Steve Holden and David Beazley, New Riders Publications.

REFERENCES:

1. Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, J. Lee and B. Ware (Addison Wesley) Pearson Education.
2. Programming Python, M. Lutz, SPD.
3. Core Python Programming, Chun, Pearson Education.
4. Guide to Programming with Python, M. Dawson, Cengage Learning.
5. Perl by Example, E. Quigley, Pearson Education.
6. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD.

Course Outcomes:

- Analyze the differences between typical scripting languages and application programming languages.
- Application of knowledge of scripting languages to design programs for simple applications.
- Create software systems using scripting languages, including Perl and Python.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. I Sem

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

OPEN ELECTIVE II

(R17A0353) ENTERPRISE RESOURCE PLANNING

Course Objectives:

Course Objectives:

- To understand ERP systems,
- To evaluate ERP software and modules
- To analyze Implementation of ERP
- To create post implementation on ERP
- To implement emerging trends on ERP

UNIT 1

INTRODUCTION: Overview and Benefits of ERP, ERP Related Technologies- Business Process Reengineering (BPR), Online Analytical Processing (OLAP), Supply chain Management (SCM). Applications of ERP.

UNIT II

ERP IMPLEMENTATION: Implementation and Product Lifecycle, Implementation Methodology, Planning Evaluation and selection of ERP systems, Organizing the Project Management and Monitoring. Case Study on Manufacturing.

UNIT III

ERP MODULES: Business modules in an ERP Package- Manufacturing, Human Resources, Plant Maintenance, Materials Management, Data Warehousing, Data Mining, Quality Management, Sales and Distribution. Case Study in Banking Sector.

UNIT IV

POST IMPLEMENTATION: Overview of ERP software solution. Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of ERP Implementation. Case Study of Success Story and Failure of Processing Sector.

UNIT V

EMERGING TRENDS IN ERP: Extended ERP system, ERP add-ons –Customer Relations Management (CRM), Customer satisfaction (CS). Business analytics etc- Future trends in ERP systems-web enabled, Wireless technologies. Case Study in Service Sector.

TEXT BOOKS:

1. Jagan Nathan Vaman, ERP in Practice, Tata McGraw-Hill, 2008
2. Alexis Leon, "ERP Demystified", Tata McGraw Hill, New Delhi, 2000
3. Mahadeo Jaiswal and Ganesh Vanapalli, ERP Macmillan India, 2009.

REFERENCE BOOKS:

1. Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008.
2. Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2nd edition, 2006.
3. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology, USA, 2001.

Course Outcomes:

- Understanding ERP systems by the students,
- Evaluated ERP software and modules for real time implementation
- Various analyses done to Implementation of ERP
- post implementation on ERP observed for various markets
- extended emerging trends on ERP for business analytics

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech ME - I Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0385) MACHINE TOOLS AND METROLOGY LAB

Course Objectives:

- To learn the Step turning and taper turning and thread cutting on lathe machine
- Practical exposure on Flat Surface machining, Shaping, Slotting, Milling, drilling and grinding operations.
- Student able to learn about Mechanical parameter measuring systems.
- Student able to learn about different alignment techniques.
- To learn the measurement of the Angle and tapers by Bevel protractor, Sine bar, etc.

PART A: MACHINE TOOLS

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.

PART B: METROLOGY

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 of test on the lathe.
5. Machine tool alignment test on milling machine.
6. Tool maker's 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 maker's microscope.

Note: Total 10 experiments are to be conducted.

Course Outcomes:

- Demonstrate the working principle and parts of different machine tools used in machine shop.
- Inspect machine tools whether properly aligned or not.
- Create stepped surface using shaper and keyways using milling machine, perform different turning operations.
- Apply the procedures to measure length, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments.
- Measure effective diameter of thread profile using different methods.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech ME - I Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0386) THERMAL ENGINEERING LAB

Course Objectives:

- To study procedure to draw the valve and port timing diagram of CI/SI engines.
- To understand the performance characteristics of CI engines (both SI and CI engines) in terms of heat balancing, economical speed variations, air fuel ratio influence on the engine.
- To demonstrate and understand Morse test on multi cylinder SI engine
- To understand working and performance of reciprocating air compressor
- To study design and working of the different types of boilers

LIST OF EXPERIMENTS

1. I.C. Engine Valve / Port Timing Diagrams
2. I.C. Engine Performance Test for 4 Stroke SI engines
3. I.C. Engine Performance Test for 2 Stroke SI engines
4. I.C. Engine Morse/ Retardation/ Motoring Tests
5. I.C. Engine Heat Balance - CI/SI Engines
6. I.C. Engine Economical speed Test on a SI engine
7. I.C. Engine Effect of A/F Ratio in a SI engine
8. Performance Test on Variable Compression Ratio of IC Engine
9. IC Engine Performance Test on a 4S CI Engine at constant speed
10. Volumetric efficiency of Air - Compressor Unit
11. Dis-assembly / Assembly of Engines
12. Study of Boilers
13. To Study the V-I Characteristics Of Solar Panel
14. To Study the Performance Of Solar Flat Plate Collector
15. To Study the Performance Of Evacuated Tube Collector

Note: Total 10 experiments are to be conducted.

Course Outcomes:

- Draw the valve and port timing diagram of SI engine & CI engine.
- Calculate & compare the performance characteristics of diesel and petrol engines.
- Apply the concept of Morse test on multi cylinder SI engine.
- Analyze the efficiency of reciprocating air compressor.
- Understand the working of boilers.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-II Sem

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

(R17A0319) MACHINE DESIGN-II

NOTE: Design Data Book is permitted. Design of all components should include design for strength and rigidity apart from engineering performance requirements.

Course objectives:

- To apply principles of design to mechanical power transmission elements like bearings and to design appropriate bearing
- To design the engine parts like piston, connecting rod and analyze design procedure under different loading conditions
- To introduce the concept, procedures, and data to analyze machine elements in power transmission systems.
- To apply principles of design and analyze the forces in mechanical power transmission elements such as gears
- Implement basic principles for the design of power screws and the forces, couples, torques etc,

UNIT-I

BEARINGS: Types of Journal bearings – Lubrication – Bearing Modulus – Full and partial bearings – Clearance ratio – Heat dissipation of bearings, bearing materials – journal bearing design – Ball and roller bearings – Static loading of ball & roller bearings, Bearing life.

UNIT-II

ENGINE PARTS: Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – Pistons, Forces acting on piston – Construction, Design and proportions of piston.

UNIT-III

POWER TRANSMISSION SYSTEMS AND PULLEYS : Transmission of power by Belt and Rope drives, Transmission efficiencies, Belts – Flat and V types .

MECHANICAL SPRINGS: Stresses and deflections of helical springs – Extension and compression springs – Design of springs for fatigue loading – natural frequency of helical springs – Energy storage capacity – helical torsion springs .

UNIT-IV

GEARS: Spur gears & Helical gears- important Design parameters – Design of gears using AGMA procedure involving Lewis and Buckingham equations. Check for wear.

UNIT-V

DESIGN OF POWER SCREWS: Design of screw, Square ACME , Buttress screws, compound screw, differential screw.

TEXT BOOKS :

1. Machine Design by R.S.Khurmi and J.K.Gupta, S.ChandPublishers,NewDelhi.
2. Machine Design, S MD Jalaludin, AnuradhaPublishers.
3. Design of Machine Elements by V. BhandariTMH

REFERENCE BOOKS:

1. Machine Design Data Book by S MD Jalaludin, AnuradhaPublishers
2. Machine Design Data Book by P.S.G. College ofTechnology
3. Machine Design by Pandya and Shah, ChortarPublications.
4. Machine Design / R.N.Norton
5. Mechanical Engineering Design / JEShigley.

Course Out comes:**Student will be able to:**

- To gain the knowledge on bearings and Select suitable bearings and its constituents from manufacturers catalogues under given loading conditions
- Calculate the design parameter for energy storage element and engine components, connecting rod and piston
- To understand the types belt drives and Select suitable belt drives and associated elements from manufacturers catalogues under given loading conditions to design the springs for different loading conditions
- Select appropriate gears for power transmission on the basis of given load and speed Design gears based on the given conditions Apply the design concepts to estimate the strength of the gear
- Analyze power screws subjected to loading

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-II Sem

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

(R17A0320) FINITE ELEMENT METHODS

Objectives:

- To enable the students to understand fundamentals of finite element analysis and the principles involved in the discretization of domain with various elements, polynomial interpolation and assembly of global arrays.
- To learn the application of FEM equations for trusses and Beams
- To learn the application of FEM equations for axisymmetric and CST problems
- To learn the application of FEM equations for Iso-Parametric and heat transfer problems
- To learn the application of FEM equations for dynamic analysis

UNIT I

Introduction to Finite Element Method for solving field problems, Stress and Equilibrium, Strain - Displacement relations, Stress - strain relations.

One-Dimensional Problem: finite element modeling, local coordinates and shape functions. Potential Energy approach, Assembly of Global stiffness matrix and load vector. Finite element equations, Treatment of boundary conditions.

UNIT II

Trusses: Element matrices, assembling of global stiffness matrix, solution for displacements, reaction, stresses.

BEAMS: Element matrices, assembling of global stiffness matrix, solution for displacements, reaction, stresses.

Unit III

Two Dimensional Problems: Basic concepts of plane stress and plane strain, stiffness matrix of CST element, finite element solution of plane stress problems.

Axi-Symmetric Model: Finite element modelling of axi-symmetric solids subjected to axi-symmetric loading with triangular elements.

Unit IV

Iso-Parametric Formulation: Concepts, sub parametric, super parametric elements, 2 dimensional 4 noded iso-parametric elements, and numerical integration.

Heat Transfer Problems: One dimensional steady state analysis composite wall. One dimensional fin analysis and two-dimensional analysis of thin plate.

Unit V

Dynamic Analysis: Formulation of finite element model, element matrices, evaluation of Eigen values and Eigen vectors for a stepped bar and a beam.

Text Books:

1. Tirupathi.R. Chandrupatla and Ashok D. Belegundu, Introduction to Finite elements in Engineering. PHI.
2. S Senthil, Introduction of Finite Element Analysis. Laxmi Publications.
3. SMD Jalaluddin, Introduction of Finite Element Analysis. Anuradha Publications.
4. The Finite Element Method for Engineers – Kenneth H. Huebner, Donald John Wiley & sons (ASIA) Pte Ltd.

References:

1. K. J. Bathe, Finite element procedures. PHI.
2. SS Rao, The finite element method in engineering. Butterworth Heinemann.
3. J.N. Reddy, An introduction to the Finite element method. TMH.
4. Chennakesava, R Alavala, Finite element methods: Basic concepts and applications. PHI.

Course Outcomes:

- Identify mathematical model to solve common engineering problems by applying the finite element method and formulate the elements for one dimensional bar structures and solve problems in one dimensional bar structures.
- Derive element matrices to find stresses in trusses and Beams
- Formulate FE characteristic equations for axisymmetric problems and analyze plain stress, plain strain and Derive element matrices for CST elements.
- Formulate FE characteristic equations for isoparametric problems and heat transfer problem.
- Solve dynamic problems where the effect of mass matters during the analysis.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-II Sem

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

(R17A0321) HEAT TRANSFER

***Note:** Heat and Mass Transfer data books are permitted

Course Objectives:

- Student can able to learn about modes of heat transfer and conduction heat transfer
- Solve lumped and Heisler charts parameter transient heat transfer problems
- Student can learn types of convection and applications.
- Student can learn phases of heat transfer, heat exchanger performance
- Student able to learn different laws of Radiation and its applications.

UNIT-I

Introduction: Basic modes of heat transfer- Rate equations – Differential heat conduction equation in Cartesian, Cylindrical systems. Steady state one dimensional heat conduction solutions for plain and composite slabs, cylinders and spheres, - Critical thickness of insulation- Heat conduction through fins of uniform section- Fin effectiveness and efficiency.

UNIT-II

Unsteady state Heat Transfer conduction: I-D Transient heat conduction- Lumped system analysis, and solutions by use of Heisler charts.

UNIT-III

Convection: Dimensional analysis- Continuity, momentum and energy equations - Boundary layer theory concept- Free, and Forced convection- Approximate solution of the boundary layer equations - Laminar and turbulent heat transfer correlation-

UNIT-IV

Heat Exchangers: Types of heat exchangers- Parallel flow- Counter flow- Cross flow heat exchangers- Overall heat transfer coefficient- LMTD and NTU methods- Fouling factor - Heat exchangers with phase change.

Boiling and Condensation: Different regimes of boiling- Nucleate, Transition and Film boiling. Condensation concepts.

UNIT- V

Radiation: Black body radiation- radiation field, Kirchhoff's laws- shape factor- Stefan Boltzman equation- Heat radiation through absorbing media- Radiant heat exchange, parallel and perpendicular surfaces.

TEXT BOOKS:

1. Heat Transfer, by J.P.Holman, Int.Student edition, McGraw Hill BookCompany.
2. Fundamentals of Heat and Mass Transfer- Sachdeva, New AgePublications

REFERENCE BOOKS:

1. Heat Transfer byS.P.Sukhatme.
2. Heat transfer by YunusACengel.
3. Heat transfer by Arora and Domakundwar, Dhanpat Rai & sons, NewDelhi

Course Outcomes:

- To identify the modes of heat transfer and calculate theconduction in various solids.
- Calculate unsteady state heat conduction problems applied to differentgeometries.
- To solve the heat convection in variousmedium.
- Toevaluatetheheattransferinphasechangeprocess,design heat exchange equipment based on the need that fit toapplication.
- To learn about the radiation and its use in reallife

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-II Sem

| L | T/P/D | C |
|---|-------|---|
| 4 | 0 | 4 |

(R17A0322) CAD/CAM**Course Objectives:**

- To provide an overview of how computers are being used in design, development of manufacturing plans and manufacture
- To get effective knowledge on the usage of mathematical equations in model development through the computer.
- To understand different types of drafting and solid modelling commands and to understand the working principle of NC, CNC, and DNC and can develop a program using G and M codes.
- Study of different types of production, Knowledge of group technology (GT).
- Detailed study of Computer Aided Quality Control.

UNIT-I

Introduction: Computers in Industrial Manufacturing, Product cycle, CAD/CAM Hardware, Basic structure.

Computer Graphics: Raster scan graphics coordinate system, database structure for graphics modeling, transformation of geometry, 3D transformations, clipping.

UNIT-II

Geometric modeling: Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired.

UNIT-III

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 Technology: 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.

TEXT BOOKS:

1. CAD / CAM Theory and Practice / Ibrahim Zeid / TMHPublishers
2. CAD / CAM / A Zimmers&P.Groover/PE/PHIPublishers
3. Automation,Productionsystems&ComputerintegratedManufacturing/Groover/
PearsonEducation

REFERENCE BOOKS:

1. CAD/CAM/CIM/RadhakrishnanandSubramanian/NewAgePublishers
2. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson
Edu
3. CAD/CAM: Concepts and Applications/Alavala/ PHI Publishers Computer Numerical
Control Concepts and programming / Warren S Seames / ThomsonPublishers
4. CAD / CAM – P N RAO McGraw HillPublications

Course Outcomes:

- Understandtheapplicationsofcomputerinthedesignandmanufacturing.
- Understand and develop the Mathematical representations of curves used in
geometricconstruction.
- Understand the concept of Drafting commands for solid modeling and
Understand the concept and working principle of NC, CNC, and DNC and can
developaprogramusingGandMcodes.
- Make use of GT and CAPP concepts and are able to apply these concepts in
bringingthebenefitsofmassproductioninrealworkingenvironment.
- Plan the computer integrated production planning in working environment and
abletoanalyzethequalityofaproductthroughcomputeraidedqualitycontrol

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-II Sem

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

(R17A0323) AUTOMOBILE ENGINEERING (CORE ELECTIVE – II)

Course Objectives:

- To understand basics of automobile engineering, conversant with vehicle structure & Engines.
- To make the student conversant with auxiliary systems.
- To make the student conversant with transmission systems.
- To make the student conversant with steering, brakes & suspension systems.
- To make the student conversant with alternative energy sources.

UNIT-I VEHICLE STRUCTURE AND ENGINES

Types of automobiles vehicle construction and different layouts, chassis, frame and body, Vehicle aerodynamics (various resistances and moments involved), IC engines components- functions and materials, variable valve timing (VVT).

UNIT-II ENGINE AUXILIARY SYSTEMS

Electronically controlled gasoline injection system for SI engines, Electronically controlled diesel injection system (Unit injector system, Rotary distributor type and common rail direct injection system), Electronic ignition system (Transistorized coil ignition system, capacitive discharge ignition system), Turbo chargers (WGT, VGT), Engine emission control by three way catalytic converter system, Emission norms (Euro and BS).

UNIT-III TRANSMISSION SYSTEMS

Clutch-types and construction, gear boxes- manual and automatic, gear shift mechanisms, Over drive, transfer box, fluid flywheel, torque converter, propeller shaft, slip joints, universal joints, Differential and rear axle, Hotchkiss Drive and Torque Tube Drive.

UNIT-IV STEERING, BRAKES AND SUSPENSION SYSTEMS

Steering geometry and types of steering gear box- Power Steering, Types of Front Axle, Types of Suspension Systems, Pneumatic and Hydraulic Braking Systems, Antilock Braking System (ABS), electronic brake force distribution (EBD) and Traction Control.

UNIT-V ALTERNATIVE ENERGY SOURCES

Use of Natural Gas, Liquefied Petroleum Gas, Bio-diesel, Bio-ethanol, Gasohol and Hydrogen in Automobiles- Engine modifications required Performance, Combustion and Emission Characteristics of SI and CI engines with these alternate fuels - Electric and Hybrid Vehicles, Fuel Cells.

TEXT BOOKS:

1. Jain K.K. and Asthana R.B, Automobile Engineering Tata McGraw Hill Publishers, New Delhi, 2002.
2. Kirpal Singh, Automobile Engineering, Vol 1 & 2, Seventh Edition, Standard Publishers, New Delhi, 13th Edition 2014.

REFERENCE BOOKS:

1. Ganesan V. Internal Combustion Engines, Third Edition, Tata McGraw-Hill, 2012.
2. Heinz Heisler, Advanced Engine Technology, SAE International Publications USA, 1998.
3. Joseph Heitner, Automotive Mechanics, Second Edition, East-West Press, 1999.
4. Martin W, Stockel and Martin T Stockle, Automotive Mechanics Fundamentals, The Good heart - Will Cox Company Inc, USA, 1978.
5. Newton, Steeds and Garet, Motor Vehicles, Butterworth Publishers, 1989.

Course Outcomes:

- Ability to identify & description of different components & system of automobile.
- Students will be able to explain working principle of various systems automobile.
- Students will be able to explain working principle of transmission systems.
- Able to understand steering, brakes & suspension systems.
- Students will be able to understand different alternative energy sources used in IC engine.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-II Sem

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

(R17A0324) COMPUTATIONAL FLUID DYNAMICS (CORE ELECTIVE – II)

Course Objectives:

To enable the students to

- Provide with sufficient background to understand the mathematical representation of the governing equations of fluid flow and heat transfer.
- Solve one and two-dimensional ordinary and partial differential equations using traditional CFD tools.
- Understand the various discretization techniques.
- Understand the turbulence models and grid generation techniques.
- How to apply explicit, implicit and semi-implicit methods of finite differencing.
- To help the students solve fluid flow field using some popular CFD techniques

UNIT-I

Governing Equations and Boundary Conditions: Basics of computational fluid dynamics – Governing equations of fluid dynamics – Continuity, Momentum and Energy equations – Chemical species transport – Physical boundary conditions – Time-averaged equations for Turbulent Flow – Turbulent–Kinetic Energy Equations – Mathematical behaviour of PDEs on CFD – Elliptic, Parabolic and Hyperbolic equations.

UNIT-II

Finite Difference and Finite Volume Methods for Diffusion: Derivation of finite difference equations – Simple Methods – General Methods for first and second order accuracy – Finite volume formulation for steady state One, Two and Three -dimensional diffusion problems – Parabolic equations – Explicit and Implicit schemes – Example problems on elliptic and parabolic equations – Use of Finite Difference and Finite Volume methods.

UNIT-II

Finite Volume Method for Convection Diffusion: Steady one-dimensional convection and diffusion – Central, upwind differencing schemes properties of discretization schemes – Conservativeness, Boundedness, Transportiveness, Hybrid, Power-law, QUICK Schemes.

UNIT-IV

Flow Field Analysis: Finite volume methods -Representation of the pressure gradient term and continuity equation – Staggered grid – Momentum equations – Pressure and Velocity corrections – Pressure Correction equation, SIMPLE algorithm and its variants – PISO Algorithms.

UNIT-V

Turbulence Models and Mesh Generation: Turbulence models, mixing length model, Two equation (k- ϵ) models – High and low Reynolds number models – Structured Grid generation – Unstructured Grid generation – Mesh refinement – Adaptive mesh – Software tools.

TEXT BOOKS:

1. Versteeg, H.K., and Malalasekera, W., "An Introduction to Computational Fluid Dynamics: The finite volume Method", Pearson Education Ltd. Second Edition, 2007.
2. Ghoshdastidar, P.S., "Computer Simulation of flow and heat transfer", Tata McGraw Hill Publishing Company Ltd., 1998.
2. Patankar, S.V. "Numerical Heat Transfer and Fluid Flow", Hemisphere Publishing Corporation, 2004. AULibrary.com99.

REFERENCE BOOKS:

1. J.D. Anderson, Jr., (2000), Computational Fluid Dynamics – The basics with applications, McGraw-Hill, Inc.
2. Muralidhar, K., and Sundararajan, T., "Computational Fluid Flow and Heat Transfer", Narosa Publishing House, New Delhi, 1995.
3. Prodip Niyogi, Chakrabarty, S.K., Laha, M.K. "Introduction to Computational Fluid Dynamics", Pearson Education, 2005.

Course Outcomes:

- Demonstrate & explain geometrical model of a fluid flow.
- Describe specific boundary conditions and solution parameters.
- Analyze the results and draw the appropriate inferences.
- Solve fluid flow fields using CFD methods
- Model fluid flow problems and heat transfer.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech, ME-II Sem

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

(R17A0325) COMPOSITE MATERIALS (CORE ELECTIVE – II)

Course Objectives:

- To be familiar with classification and characteristics of composite material and their applications.
- To gain the knowledge about manufacturing methods of composites.
- To know the testing methods related to composite materials.
- To learn fabrication techniques for metal matrix materials and powder metallurgy techniques.
- To gain knowledge about fiber and matrix properties for structural applications.

UNIT-I

Introduction: Definitions, Composites, Reinforcements and matrices, Types of reinforcements, Types of matrices, Types of composites, Carbon Fibre composites, Properties of composites in comparison with standard materials, Applications of metal, ceramic and polymer matrix composites.

UNIT-II

Manufacturing methods: Hand and spray lay - up, injection molding, resin injection, filament winding, pultrusion, centrifugal casting and prepregs. Fibre/Matrix Interface, mechanical. Measurement of interface strength.

UNIT-III

Mechanical Properties -Stiffness and Strength: Geometrical aspects – volume and weight fraction. Unidirectional continuous fibre, discontinuous fibers, Short fiber systems, woven reinforcements –Mechanical Testing: Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.

UNIT-IV

Laminates: Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Plate Stiffness and Compliance, Computation of Stresses, Types of Laminates -, Symmetric Laminates, Anti-symmetric Laminate, Balanced Laminate, Quasi-isotropic Laminates, Cross-ply Laminate, Angle-ply Laminate. Orthotropic Laminate, Laminate Moduli, Hygrothermal Stresses.

UNIT-V

Joining Methods and Failure Theories : Joining –Advantages and disadvantages of adhesive and mechanically fastened joints. Typical bond strengths and test procedures.

TEXT BOOKS:

1. K.K. Chawla, (1998), Composite Materials, Springer-Verlag, New York
2. B.T. Astrom, (1997), Manufacturing of Polymer Composites, Chapman & Hall
3. Composite materials by J.N.Reddy

REFERENCE BOOKS:

1. Stuart M Lee, J. Ian Gray, Miltz, (1989), Reference Book for Composites Technology, CRC press
2. Frank L Matthews and R D Rawlings, (2006), Composite Materials: Engineering and Science, Taylor and Francis.
3. D. Hull and T. W. Clyne, (1996), Introduction to Composite Materials, Cambridge University Press
4. Analysis and Performance of Fiber Composites by Bhagwan D. Agarwal
5. Mechanics of Composite Materials by Autar K. Kaw

Course Outcomes:

- Explain concept of the composite materials and its terminologies used.
- Analyze the different processing/fabrication techniques of composite materials especially fiber components
- Describe the polymer materials and its applications which are having better improved properties to suit with conventional materials.
- Analyze the fiber and matrix properties for structural applications.
- Evaluate the optimum fabrication techniques for metal matrix materials and powder metallurgy techniques to enhance material properties.



OPEN ELECTIVES III

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem

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

**OPEN ELECTIVE III
(R17A0454) ROBOTICS & AUTOMATION**

Course Objectives:

- This introductory course is valuable for students who wish to learn about robotics through a study of industrial robot systems analysis and design.
- This course is suited to students from engineering and science backgrounds that wish to broaden their knowledge through working on a subject that integrates multi-disciplinary technologies.
- This course is to analyse the industrial robotic applications.
- To understand the robot manipulators of their Kinematics and Kinetic control.
- The performance of manipulate can analyse through simulation by MATLAB

UNIT – I

Introduction & Basic Definitions: History of robots-robot anatomy, Coordinate Systems, Human arm Characteristics, Cartesian, Cylindrical, Polar, coordinate frames, mapping transform.

UNIT – II

Kinematics–Inverse Kinematics: Kinematics, Mechanical structure and notations, description of links and joints, Denavit-Hatenberg notation, manipulator transformation matrix, examples inverse kinematics.

UNIT – III

Differential Motion – Statics – Dynamic Modeling: Velocity Propagation along links, manipulator Jacobian – Jacobian singularities – Lagrange Euler formulation Newton Euler formulation basics of trajectory planning.

UNIT – IV

Robot Systems: Actuators Sensors and Vision: Hydraulic and Electrical Systems Including Pumps, valves, solenoids, cylinders, stepper motors, Encoders and AC Motors Range and use of sensors, Micro switches, Resistance Transducers, Piezo-electric, Infrared and Lasers Applications of Sensors : Reed Switches, Ultrasonic, Barcode Readers and RFID – Fundamentals of Robotic vision.

UNIT – V

Robots and Applications: Industrial Applications – Processing applications – Assembly applications, Inspection applications, Non Industrial applications.

TEXTBOOKS

1. Robotics and Control: R.K. Mittal and I.J. Nagarath, TMH 2003.
2. Introduction to Robotics – P.J. Mckerrow, ISBN:0201182408

REFERENCES

1. Robotics – K.S. Fu, R.C. Gonzalez and C.S.G. Lee, 2008, TMH.
2. Introduction to Robotics – S. Nikv, 2001, Prentice Hall,
3. Mechatronics and Robotics: Design & Applications – A. Mutanbara, 1999, CRC Press.

Course Outcomes:

Upon the completion of this course, the student will be able to:

- Describe the various elements that make an industrial robot system.
- Discuss various applications of industrial robot systems.
- Analyze robot manipulators in terms of their kinematics, kinetics, and control
- Model robot manipulators and analyze their performance, through running simulations using a MATLAB-based Robot Toolbox
- Select an appropriate robotic system for a given application and discuss the limitations of such a system
- Program and control an industrial robot system that performs a specific task.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem

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

OPEN ELECTIVE III
(R17A1253)MANAGEMENT INFORMATION SYSTEMS

Course Objective:

- To understand the competitive advantage of using information systems in the organization for the needful assistance in decision making and management.
- To learn how to plan for information systems & implementation.
- To learn about Management of IS: Information system planning.
- To understand Building of Information Systems Structured Analysis Tools, System Design.
- To study about security aspects of information systems.

Unit-I:

Introduction : MIS importance, definition, nature and scope of MIS, Structure and Classification of MIS, Information and Systems Concept, Types of Information, Information systems for competitive advantage.

Case Study: MIS at any business establishment.

Unit-II:

Business Applications of Information Systems : E-Commerce, ERP Systems, DSS, Business Intelligence and Knowledge Management System.

Case Study: Knowledge Management Systems at an Enterprise.

Unit-III:

Management of IS: Information system planning, system acquisition, systems implementation, evaluation & maintenance of IS, IS Security and Control.

Effectiveness of MIS: A Case Study.

Unit-IV:

Building of Information Systems: System Development Stages, System Development Approaches.

Systems Analysis and Design- Requirement Determination, Strategies for Requirement Determination.

Structured Analysis Tools, System Design – Design Objectives, Conceptual Design, Design Methods. Detailed system design.

Unit-V:

Introduction to Cyber Crime : Cyber Crime Definition and origin of the word, cyber crime and

information security, cyber criminals. Classification of cyber criminals-Legal Perspectives-Indian Perspectives-Cyber crimes and indian ITA 2000,Global perspective on cybercrime-Cybercrime era.(Refer : Nina Godbole et al)

TEXT BOOK

D P Goyal, Management Information Systems–Managerial Perspective, MacMillan, 3rd Edition, 2010.

REFERENCE:

1. Nina Godbole & Sunit Belapure “Cyber Security” Wiley India 2012.
2. Jawadkar, MIS Text and Cases, TMH, 2012.
3. Dr Milind M Oka “Cases in Management Information System ‘Everest, 2012.
4. A K Gupta, Sharma “Management of Systems” Macmillan, 2012.
5. Sandra Senf “Information Technology Control and Audit” 3e, CRC Press, 2012.
6. Apache OFBiz for Ecommerce and ERP -<https://ofbiz.apache.org/>
7. Magento for Ecommerce (B2B Commerce) -<https://magento.com/>
8. Adempiere – ERP :<http://www.adempiere.net/web/guest/welcome>
9. Analytica – DSS -<http://www.lumina.com>
10. OpenRules – Business Rules and Decision Management system -<http://openrules.com/>

Course Outcome:

- Ability to apply Concepts & applications of Management Information Systems.
- Ability to perform Information Systems Planning & Implementations.
- Able to explain Information system planning.
- Ability to adapt Building of Information Systems Structured Analysis Tools, System Design.
- Ability to adapt Cyber-crime and information security procedures.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem

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

OPEN ELECTIVE III (R17A0519) WEB TECHNOLOGIES

Objectives:

- Giving the students the insights of the Internet programming and how to design and implement complete applications over the web.
- It covers the notions of Web servers and Web Application Servers, Design Methodologies with concentration on Object-Oriented concepts, Client-Side
- Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to web applications,
- Programming Common Gateway Interfaces, Programming the User Interface for the web applications.

UNIT I:

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.

HTML Common tags: List, Tables, images, forms, frames, Cascading Style Sheets (CSS) & its Types. Introduction to Java Script, Declaring variables, functions, Event handlers (onclick, onsubmit, etc.,) and Form Validation.

UNIT II:

Introduction to XML: Document type definition, XML Schemas, Presenting XML , Introduction to XHTML, Using XML Processors: DOM and SAX.

PHP: Declaring Variables, Data types, Operators, Control structures, Functions.

UNIT III:

Web Servers and Servlets: Introduction to Servlets, Lifecycle of a Servlet, JSDK, Deploying Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Cookies and Session Tracking.

UNIT IV:

Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.* package, Connecting to database in PHP, Execute Simple Queries, Accessing a Database from a Servlet. Introduction to struts frameworks.

UNIT V:

JSP Application Development: The Anatomy of a JSP Page, JSP Processing. JSP Application Design and JSP Environment, JSP Declarations, Directives, Expressions, Scripting Elements, implicit objects. **Java Beans:** Introduction to Beans, Deploying java Beans in a JSP page.

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY Dreamtech (UNITs 1,2)

2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson (UNITS 3, 4,5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta, Pearson Education,2007.
2. Internet and World Wide Web – How to program by Dietel and Nieto PHI/ Pearson Education Asia.
3. Jakarta Struts Cookbook, Bill Siggelkow, S P D O’ Reilly for chap8.
4. March’s beginning JAVA JDK 5, Murach,SPD
5. An Introduction to WEB Design and Programming –Wang-Thomson
6. PHP: The Complete Reference Steven HolznerTataMcGraw-Hill.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem

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

OPEN ELECTIVE III**(R17A0553) DATA STRUCTURES USING PYTHON****COURSE OBJECTIVES:**

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I

Introduction to Python, Installation and Working with Python, Understanding Python variables Python basic Operators, understanding python blocks, Python Data Types: Declaring and using Numeric data types: int, float, complex, Using string data type and string operations.

UNIT II

Control Flow- if, if-elif-else, loops, for loop using ranges, string, Use of while loops in python, Loop manipulation using pass, continue, break and else, Programming using Python conditional and loops block, Python arrays.

UNIT III

Functions -Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function - Global and Local Variables. Powerful Lambda function in python.

UNIT IV

Data Structures-List Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions, Dictionary manipulation, list and dictionary in build functions

UNIT V

Sorting: Bubble Sort, Selection Sort, Insertion Sort, Mergesort, Quick sort. Linked Lists, Stacks, Queues

COURSE OUTCOMES:

Upon completion of the course, students will be able to

- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs

TEXT BOOKS

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist “, 2nd edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016.
2. R. Nageswara Rao, “Core Python Programming”, dreamtech
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech II Sem

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

OPEN ELECTIVE III

(R15A0354) NANO TECHNOLOGY

Course Objectives:

- To learn about basis of NanoMaterials.
- In this course we focus on synthetic aspects for the design of nanostructured materials.
- We describe different approaches including both the bottom-up (includes both chemical and physical methods) and the top-down methods (mainly physical methods) for the synthesis of nanostructured materials.
- The course will then focus on different type of nanostructures with a special emphasis on carbon nanotubes (CNT), metal and metal oxide nanoparticles, core-shell nanostructures and self assembly of these nanostructures.
- The dependence of various properties (dielectric, magnetic and optical) with size will be discussed.

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, nanoparticles 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 nanoparticles.

Optical properties: Optical properties, special properties and the coloured glasses.

Magnetic Properties: Soft magnetic Nanocrystalline alloy, Permanent magnetic Nanocrystalline materials, Giant Magnetic Resonance, Electrical Properties, Optical Properties, Thermal Properties, and Mechanical Properties.

UNIT-III Synthesis Routes: Top & Bottom up approaches: Physical Vapor Deposition, Micromulsion, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Solgel method, Spray Pyrolysis, Template Based synthesis, Lithography.

UNIT-IV Tools to Characterize Nanomaterials: X-Ray Diffraction (XRD), Small Angle X-ray scattering (SAXS), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Ion Microscope (FEM), Three-dimensional Atom Probe (3DAP), Nanoindentation

UNIT-V Applications of Nanomaterials: Nano-electronics, Micro- and Nano-electromechanical systems (MEMS/NEMS), Nanosensors, Nanocatalysts, Cosmetic and Consumer Goods, Structure and Engineering, Automotive Industry, Water Treatment and the environment, Nano-medical applications, Textiles, Paints, Energy, Defence and Space

Applications.

TEXT BOOKS:

- 1) Text Book of Nano Science and Nano Technology – B.S. Murthy, P.Shankar, Baldev Raj, B.B. Rath and James Munday, UniversityPress-IIM.
- 2) Introduction to Nanotechnology – Charles P. Poole, Jr., and Frank J. Owens, Wiley India Edition, 2012.
- 3) Guozhong Cao, Nanostructures and Nano-materials:Synthesis, Properties and Applications, Imperial College Press2004.

REFERENCES BOOKS:

- 1) Nano: The Essentials by T. Pradeep, McGraw- HillEducation.
- 2) Nanomaterials, Nanotechnologies and Design by Michael F. Ashby, Paulo J. Ferreira and Daniel L.Schodek.
- 3) Transport in Nano structures- David Ferry, Cambridge University press2000
- 4) Nanofabrication towards biomedical application: Techniques, tools, Application and impact – Ed. Challa S.,S. R. Kumar, J. H.Carola.
- 5) Carbon Nanotubes: Properties and Applications- Michael J.O’Connell.
- 6) Electron Transport in Mesoscopic systems – S. Dutta, Cambridge Universitypress.
- 7) Nanomaterials Synthesis, Properties and Applications Edited by A S Edelstein and R C Cammarata, IOP Publishing Ltd1996.

Course Outcomes:

- Upon completion of course, students will familiarize about NanoTechnology.
- Students should demonstrate the preparation of NanoTechnology.
- Upon course completion, students will develop knowledge in characteristic Nano Technology & Nano Materials.
- Student should able to explain about carbon nanotube metal oxideformation.
- Student able to understand different properties along with sizes.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

III Year B.Tech. II Sem

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

**OPEN ELECTIVE III
(R17A0355) TOTAL QUALITY MANAGEMENT**

Course Objectives:

- To facilitate the understanding of Quality Management principles and process.
- To understand Customer focus, Employee focus and their involvement and Supplier Management.
- Student able to know about Organizing for TQM.
- To gain the knowledge on The Cost of Quality
- To gain the knowledge on all Universal Standards of Quality.

UNIT – I

Introduction, The concept of TQM, Quality and Business performance, attitude, and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs. Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT -II

Customer Focus and Satisfaction: internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer – Supplier relationships. Bench Marking: Evolution of Bench Marking, meaning of bench marking, benefits of bench marketing, the bench marking procedure, pitfalls of bench marketing.

UNIT- III

Organizing for TQM: The systems approach, organizing for quality implementation, making the transition from a traditional to a TQM organization, Quality Circles, seven Tools of TQM: Stratification, check sheet, Scatter diagram, Kepner & Tregoe Methodology.

UNIT- IV

The Cost of Quality: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost information, Accounting Systems and Quality Management.

UNIT –V

ISO9000: Universal Standards of Quality: ISO around the world, The ISO9000 ANSI/ASQC Q- 90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO9000 and services, the cost of certification implementing the system.

TEXT BOOK:

- Total Quality Management / Joel E. Ross/Taylor and Francis Limited
- Total Quality Management/P. N.Mukherjee/PHI

REFERENCE BOOKS:

- Beyond TQM / Robert L. Flood
- Total quality management by Paneer Selvam
- Statistical Quality Control / E.L. Grant.
- Total Quality Management: A Practical Approach/H.Lal
- Quality Management/Kanishka Bedi/Oxford University Press/2011
- Total Engineering Quality Management/Sunil Sharma/Macmillan

Course Outcomes:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
- To give the students an overview of TQM, various Quality aspects and.
- Student can be able to manage industrial quality organizing for TQM.
- To give importance of Top Management Commitment in any organization for maintaining product / services quality.
- To give suitable standards of quality for TQM.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

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

OPEN ELECTIVE III (R17A0554) PYTHON PROGRAMMING

III Year B.Tech II Sem

| |
|----------|
| LT/P/D C |
| 3 -/-/ 3 |

OBJECTIVES:

- 1) To read and write simple Python programs.
- 2) To develop Python programs with conditionals and loops.
- 3) To define Python functions and call them.
- 4) To use Python data structures — lists, tuples, dictionaries.
- 5) To do input/output with files in Python.

UNIT I

INTRODUCTION DATA, EXPRESSIONS, STATEMENTS

Introduction to Python and installation , data types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments.

UNIT II

CONTROL FLOW, LOOPS

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue.

UNIT III

FUNCTIONS, ARRAYS

Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; python arrays, Access the Elements of an Array, array methods.

UNIT IV

LISTS, TUPLES, DICTIONARIES

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension;

UNIT V

FILES, MODULES, PACKAGES

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules.

OUTCOMES:

Upon completion of the course, students will be able to

- 1) Read, write, execute by hand simple Python programs.
- 2) Structure simple Python programs for solving problems.

- 3) Decompose a Python program into functions.
- 4) Represent compound data using Python lists, tuples, dictionaries.
- 5) Read and write data from/to files in Python Programs

TEXT BOOKS

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016.
2. R. Nageswara Rao, "Core Python Programming", dreamtech
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

REFERENCE BOOKS:

1. Core Python Programming, W.Chun, Pearson.
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Learning Python, Mark Lutz, Orielly

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech ME - II Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0387) HEAT TRANSFER LAB

Course Objectives :

- The primary objective of this course is to provide the fundamental knowledge necessary
- To understand the behavior of thermal systems.
- This course provides a detailed experimental analysis, including the application and heat transfer through solids, fluids, and vacuum.
- Convection, conduction, and radiation heat transfer in one and two dimensional steady and unsteady systems are examined

LIST OF EXPERIMENTS:

1. Composite Slab Apparatus – Overall heat transfer coefficient.
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.
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. Emissive apparatus.
11. Stefan Boltzman Apparatus.
12. Critical Heat flux apparatus.
13. Study of heat pipe and its demonstration.

Note: Total 10 experiments are to be conducted.

Course Outcomes:

- Perform experiments to determine the thermal conductivity of a metal rod
- Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.
- Estimate the effective thermal resistance in composite slabs
- Determine surface emissivity of a test plate
- Estimate performance of effectiveness of fin
- Calculate temperature distribution of steady and transient heat conduction through plane wall, cylinder and fin using numerical approach

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech ME - II Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0388) COMPUTER AIDED DESIGN AND COMPUTER AIDED MANUFACTURING LAB

Course Objectives

- To study the need of computers in Industrial Manufacturing, product cycle, CAD/CAM hardware, computer graphics.
- To study geometric modeling which includes curve representation and surface representation.
- To study drafting and modeling systems which includes basic geometric commands and numerical control.
- To understand the concept of group technology in part family, production flow analysis, computer aided process planning.
- To study computer aided quality control and computer integrated manufacturing systems.

LIST OF EXPERIMENTS:

- 1) Determination of deflection and stresses in 2D and 3D trusses and beams.
- 2) Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components.
- 3) Determination of stresses in 3D and shell structures (at least one example in each case)
- 4) Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.
- 5) Steady state heat transfer Analysis of plane and Axisymmetric components.
- 6) Development of process sheets for various components based on tooling Machines.
- 7) Development of manufacturing and tool management systems.
- 8) Study of various post processors used in NC Machines.
- 9) Development of NC code for freeform and sculptured surfaces using CAM packages.
- 10) Machining of simple components on NC lathe by transferring NC Code/ from a CAM package.

Any Three Software Packages from the following:

Use of AutoCAD, MicroStation, CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, CAM, MasterCAM etc.

Gibbs

Open source Softwares:

MAT LAB, NASTRON, HYPERMESH, PATRAN

Course Outcomes:

- Understand the need of computers in industrial manufacturing, product cycle, CAD/CAM hardware, computer graphics.
- Understand the geometric modeling to represent curves and surfaces.
- Understand the basic geometric commands and numerical control.
- Understand the concept of group technology, production flow analysis, process planning.
- Understand computer aided quality control and computer integrated manufacturing.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

III Year B. Tech ME - IISem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0007) TECHNICAL COMMUNICATION AND SOFT SKILLS

Course Objectives:

- To make the students recognize the role of Technical English in their academic and professional fields.
- To improve language proficiency and develop the required professional skills.
- To equip students with tools to organize, comprehend, draft short and long forms of technical work.
- to strengthen their individual and collaborative work strategies.
- The future placement needs of the student group discussions and mock interviews.

UNIT-I

Advanced Grammar : Study of advanced grammar ,transformation of sentences, tenses, concord, voices, correction of sentences.

UNIT-II

Principles of effective writing : Technical writing, Writing drafts and revising, Collaborative Writing, technical writing style and language, editing strategies to achieve appropriate technical style.

UNIT-III

Professional Communication: Extempore, Group discussion ,oral presentation, interviews, Graphic presentation, presentation aids, rapid reading, writing reports,e-mail writing, Official notes, business letters, memos, minutes of meetings.

UNIT-IV

Self Development and Assessment: Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, self esteem.

UNIT-V

Ethics: Business ethics, , Personality Development in social and office settings, netiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Complex problem solving, Creativity, leadership skills ,cubicle Etiquettes, team building.

TEXT BOOKS:

1. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Wiley..New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843).

3. Shiv Khera, You can win , Macmillan Books, New York ,2003.
4. Raman Sharma , Technical Communications , Oxford Publication, London, 2004.
5. Meenakshi Raman, Prakash Singh, Business Communication, Oxford Publication, New Delhi 2012.

REFERENCE BOOKS:

1. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
2. Sharma, R. and Mohan, K. Business Correspondence and Report Writing, TMH New Delhi 2002.
3. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

Course Outcomes:

- The students will be able to understand information which assists in completion of the assigned job tasks more successfully.
- Students will be able to communicate their ideas by writing projects, reports, instructions, diagrams and many other forms of professional writing.
- Students will also be able to adhere to ethical norms of scientific communication.
- Students will be able to strengthen their individual and collaborative work strategies.
- Acquiring and improving the skills required for placements and professional success.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-ISem

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

(R17A0326) POWER PLANT ENGINEERING

Course Objectives:

- To create awareness about various sources of energy, working of thermal power plants and combustion process
- To understand how Diesel and gas power plants are functioning
- To understand how power is achieved from renewable sources of energy and functions of hydro-electric power plants
- Able to learn about Nuclear power plants.
- To apply the concepts of economics in power plants

UNIT I

COAL BASED THERMAL POWER PLANTS Rankine cycle – improvisations, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles and Cogeneration systems.

UNIT II

DIESEL, GAS TURBINE AND COMBINED CYCLE POWER PLANTS Otto, Diesel, Dual & Brayton Cycle – Analysis & Optimisation. Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems.

UNIT III

NUCLEAR POWER PLANTS Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors : Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), Canada Deuterium- Uranium reactor (CANDU), Breeder, Gas Cooled and Liquid Metal Cooled Reactors. Safety measures for Nuclear Power plants.

UNIT IV

POWER FROM RENEWABLE ENERGY Hydro Electric Power Plants – Classification, Typical Layout and associated components including Turbines. Principle, Construction and working of Wind, Tidal, Solar Photo Voltaic (SPV), Solar Thermal, Geo Thermal, Biogas and Fuel Cell power systems.

UNIT V

ENERGY, ECONOMIC AND ENVIRONMENTAL ISSUES OF POWER PLANTS Power tariff types, Load distribution parameters, load curve, Comparison of site selection criteria, relative merits & demerits, Capital & Operating Cost of different power plants. Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants.

TEXT BOOKS:

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
3. A Text Book of Power Plant Engineering / R.K. Rajput / Laxmi Publications

REFERENCE BOOKS:

1. Power Plant Engineering / P.K. Nag II Edition / TMH Publishers
2. An Introduction to Power Plant Technology / G.D. Rai / Khanna Publishers
3. Power plant Engg / Elanchezhian / I.K. International Publishers

Course Outcomes:

- Enable students to understand about the coal handling and ash handling systems in thermal powerplants
- To understand various gas power cycles and combined power cycles
- To interpret Nuclear power station and various safety measures to be followed
- To illustrate the student to get the exposure of different renewable energy resources
- To execute and exemplify economics of power plants and waste disposal methods in Nuclear powerplants

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

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

(R17A0327) AUTOMATION AND CONTROL ENGINEERING

Course Objectives:

- To perform one or more processing operations
- To understand the need of Mechatronic systems
- To make students familiar with the construction and working principle of different types of sensors and transducers.
- Understand the fundamental concepts of electro mechanics and fluid mechanics (hydraulics and pneumatics) of Actuators and drive systems.
- To impart knowledge on the control elements
- To understand the different control schemes generally used to get best output.

UNIT-I

Introduction to automation: Types and strategies of automation, pneumatic and hydraulic components circuits, Mechanical Feeding and machine tool control to transfer the automation.

Introduction to Mechatronics: Role of various engineering disciplines in Mechatronics, Mechatronics design elements, Scope of Mechatronics, Applications of Mechatronics.

UNIT-II

Sensors and Transducers: Sensors and transducers, performance terminology, displacement, position and proximity, velocity and motion, force, fluid pressure, liquid flow, liquid level, temperature, light sensors, selection of sensors.

UNIT-III

Actuators and drive systems: Mechanical, Electrical, Hydraulic drive systems, Characteristics of mechanical, Electrical, Hydraulic and pneumatic actuators and their limitations.

UNIT-IV

Control system components: Introduction, classification of control system- classification of control systems on the basis of control signal used, Adaptive control system, Process control systems

UNIT-V

Process control: Introduction, concept of process control, Automatic controllers- digital controller, Electronic controllers, Pneumatic controllers, P-I controller, PD controller, P-I-D controller, Hydraulic controllers.

TEXT BOOKS:

1. Mechatronics, W.Bolton, Pearson Education,Asia.
2. Mechatronics, M.D. Singh and J.G. Joshi,PHI.

Reference Books:

1. Mechatronics, D.A. Bradley, D. Dawson, N.C. Buru and A.J. Loader, ChapmanHall.
2. Microprocessor Architecture, Programming & Applications, S. Ramesh, Gaonkar, Wiley Eastern.
3. The Mechatronics Handbook with ISA– The Instrumentation, Systems, Automation, Robert H. Bishop. Ed.-in-chief., CRCPress.

Course Outcomes:

- TheimportanceofautomationinindustriesandIdentificationofkeyelementsof mechatronicssystem
- Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledgeoutsidetheclassroomthroughdesignofareal-lifeinstrumentationsystem.
- Describeandanalyzeworkingprinciplesofvarioustypesofmotors,differences, characteristics and selection criteria, controlmethods.
- understand fundamental elements of drive systems, analyse the steady-state characteristicsofafewcommonlyusedtypesofactuatorsusedintheindustry.
- Thestudentswillbeabletohandledifferenttypesofcontrollerlikeelectronic, pneumatic andhydraulic.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

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

(R17A0328) MECHANICAL MEASUREMENTS AND INSTRUMENTATION

Course Objectives:

- To study concept of architecture of the measurement system.
- To deliver working principle of mechanical measurement system.
- To impart knowledge of mathematical modeling of the control system and control system under different time domain.
- To analyze the stress and strain measurements and humidity measurements
- To understand the Measurement of Force, Torque and Power Elements of Control Systems

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 – capacitive, ultrasonic, magnetic, cryogenic fuel level indicators – Bubbler 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.

TEXT BOOKS:

1. Mechanical Measurements / Beck With, Marangoni, Linehar/ PHI Publisher
2. Measurement Systems: Applications & design / D.S Kumar/McGraw Hill Publishers
3. Mechanical Measurements /Shawney/McGraw Hill Publishers

REFERENCE BOOKS:

1. Experimental Methods for Engineers / Holman/ McGraw-Hill Education
2. Mechanical and Industrial Measurements / R.K. Jain/ Khanna Publishers.
3. Instrumentation and Mechanical Measurements/A.K.Tayal/Galgotia Publications.

Course Outcomes:

- Learners should be able to identify and select proper measuring instrument for specific application. Illustrate working principle of measuring instruments.
- Explain calibration methodology and error analysis related to measuring instruments.
- Mathematically model and analyze for different measurements.
- Acquire knowledge in stress and strain measurements and Humidity measurement.
- Identify, analysis, and solve mechanical engineering problems useful to the society.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

| L | T/P/D | C |
|---|-------|---|
| 4 | 0 | 4 |

(R17A0329) PRODUCTION AND OPERATIONS MANAGEMENT

Course Objectives:

- To create a comprehensive exposure to and its significance of POM in Industries.
- To understand students with various activities of scheduling and control operation to give insight into the ongoing & futuristic trends in the control of inventory.
- To analyze and apply techniques to quality control
- To remember the importance of material management.
- To understand and to apply various analyze in cost reduction in production.

UNIT-I

Introduction to Operations Management:

Introduction to Operations Management - Role of Operations Management in total management System- Process planning and process design, Production Planning and Control: Basic functions of Production Planning and Control, Production Cycle Project, Job Shop, Assembly, batch and Continuous, life cycle management - Inter Relationship between product life cycle and process life cycle.

UNIT-II

Scheduling and control of production operations:

Aggregate planning, MPS, Operations scheduling, Product sequencing: Sequencing of products in multi-product multi-stage situations - Plant Capacity and Line Balancing. Plant layout - different types of layouts. Location and the factors influencing location. Maintenance Management: Objectives - Failure Concept, Reliability, Preventive and Breakdown maintenance, Replacement policies

UNIT-III

Forecasting: Importance of forecasting - Types of forecasting, their uses - General principles of forecasting - Forecasting techniques - qualitative methods and quantitative methods.

UNIT-IV

Resource requirement planning: Resource requirement planning, material requirement planning-manufacturing resource planning-general overview of MRP- definitions of terms used in MRP systems-MRP outputs and inputs-MRP computational procedure-Enterprise Resource planning- scope, Benefits, applications.

UNIT–V

Stores Management and materials handling:

Stores management –nature of stores- store lay out-stock verification-classification and codification - safety stock Inventory Control – Material handling-organization of material handling-factors affecting the selection of material handling equipment- types of material handling system-selection and design of handling system-types of material handling equipment-material handling and plant lay out-evaluation of materials handling performance-safety in material handling.

TEXT BOOKS:

1. Aswathappa K. and Sridhara Bhat, "Production and Operations Management", 2010, HPH.
2. Mahadevan. B, "Operations Management", 2010, Pearson Education.
3. Paneer Selvam - Production and Operations Management , PHI 2006

REFERENCE BOOKS:

1. Buffa E, Modern Production and Operations Management , John Wiley 2007
2. Chary SN, Production and Operations Management , TMH, 2009
3. P Rama Murthy-Production and Operations Management , New Age International , 2005

Course Outcomes:

- The understand significance of POM, students able to illustrate production planning functions and manage manufacturing functions in a better way.
- memorable competency in scheduling and sequencing in manufacturing operations and effect affordable manufacturing leadtime.
- To apply the techniques of quality control and control inventory with cost effectiveness.
- Get conversant with various documents procedural aspects and preparation of orders for various MRP and stores management.
- Analyzed and applied various techniques in cost reduction.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

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

(R17A0330) SMART MANUFACTURING TECHNOLOGY (CORE ELECTIVE–III)

Course Objectives:

- This course introduces the concepts of Industrial Internet of Things, and Cloud Computing.
- The objective of this course is to learn the statistics and optimization methodologies in smart manufacturing systems.
- The students will know how to apply artificial intelligence (AI) and data mining (DM) techniques to solve real problems in shop-floor level or capacity planning problems.
- Evaluation criteria and industry benchmarks for determining where and how smart manufacturing processes can benefit your organization.
- Detailed understanding of how sensors, automation and data science are transforming individual processes and improving operational performance throughout the manufacturing enterprise.

UNIT I:

Computer Integrated Manufacturing Systems Structure and functional areas of CIM system, - CAD, CAPP, CAM, CAQC, ASRS. Advantages of CIM. Manufacturing Communication Systems - MAP/TOP, OSI Model, Data Redundancy, Top- down and Bottom-up Approach, Volume of Information. Intelligent Manufacturing System Components, System Architecture and Data Flow, System Operation.

UNIT II

Components of Knowledge Based Systems - Basic Components of Knowledge Based Systems, Knowledge Representation, Comparison of Knowledge Representation Schemes, Interference Engine, Knowledge Acquisition.

UNIT III

Machine Learning - Concept of Artificial Intelligence, Conceptual Learning, Artificial Neural Networks-Biological Neuron, Artificial Neuron, Types of Neural Networks, Applications in Manufacturing.

UNIT IV

Automated Process Planning - Variant Approach, Generative Approach, Expert Systems for Process Planning, Feature Recognition, Phases of Process planning. Knowledge Based System for Equipment Selection (KBSES) - Manufacturing system design. Equipment Selection Problem, Modeling the Manufacturing Equipment Selection Problem, Problem Solving approach in KBSES, Structure of the KRSES.

UNIT V

Group Technology: Models and Algorithms Visual Method, Coding Method, Cluster Analysis Method, Matrix Formation - Similarity Coefficient Method, Sorting-based Algorithms, Bond

Energy Algorithm, Cost Based method, Cluster Identification Method, Extended CI Method. Knowledge Based Group Technology - Group Technology in Automated Manufacturing System. Structure of Knowledge based system for group technology (KBSCIT) — Data Base, Knowledge Base, Clustering Algorithm.

TEXT BOOKS:

1. Intelligent Manufacturing Systems/ Andrew Kusiak/PrenticeHall.
2. Artificial Neural Networks/ YagnaNarayana/PHI/2006
3. Automation, Production Systems and CIM/GrooverM.P./PHI/2007

REFERENCE BOOKS:

1. Neural networks: A comprehensive foundation/ Simon Hhaykin/PHI.
2. Artificial neural networks/B.Vegnanarayana/PHI
3. Neural networks in Computer intelligence/ Li Min Fu/TMH/2003
4. Neural networks/ James A Freeman David M S kapura/ Pearsoneducation/2004
5. IntroductiontoArtificialNeuralSystems/JacekM.Zurada/JAICOPublishingHouseEd. 2006.

Course outcomes:

- Students should be able to understand basic concepts of computer integrated manufacturing.
- StudentsshouldbeabletounderstandbasicComponentsofKnowledgeBasedSystems.
- Understand the Concept of ArtificialIntelligence.
- Students should be able to understand Automated ProcessPlanning.
- Students should be able to understand about grouping theparts.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

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

(R17A0331) HEATING VENTILATION AND AIR CONDITIONING (CORE ELECTIVE -III)

Course Objectives:

- The course aims to emphasize the importance of heating and ventilation systems.
- This program includes heating, ventilation and air conditioning.
- Graduates will possess the skills necessary to obtain an entry-level HVAC Technician position.
- Graduates will have an understanding of safe HVAC practices and how important they are in the HVAC environment.
- Graduates will understand the importance of professional behavior and life-long learning, and will meet the challenges of continued technological growth within the field.

UNIT I

INTRODUCTION TO HVAC: Fundamentals-Modes of Heat Transfer-Sensible Heat and Latent Heat-Basic Components of Air-Conditioning and Refrigeration machines-Basic Refrigeration System or Vapor Compression Cycle-Pressure –Enthalpy Chart-Function & Types of Compressor-Function & Types of Condenser-Function & Types of Expansion Valves, Function & Types of Evaporator-Accessories used in the System-Refrigerant and Brines

UNIT II

CLASSIFICATION OF AIR-CONDITIONING SYSTEM: Window A/C-Working of Window A/C with Line Diagrams-Split A/C-Types - Working of Split A/C with Line Diagrams-Ductable Split A/C-Working of Ductable Split A/C with Line Diagrams-Variable Refrigerant Volume (VRV)/ Variable Refrigerant Flow (VRF)-Ductable Package A/C-Working of Ductable Package A/C with Line Diagrams

UNIT III

STUDY OF PSYCHROMETRIC CHARTS: Dry Bulb Temperature-Wet Bulb Temperature-Dew Point Temperature-Relative Humidity-Humidity Ratio-Processes, Heating, Cooling, Cooling and Dehumidification, Heating and Humidification

UNIT IV

LOAD CALCULATION: Survey of Building-Cooling Load Steps-Finding Temperature difference (ΔT)-Wall, Glass, Roof, partition-Finding 'U' Factor-Wall, Glass, Roof, Partition-Finding Ventilation requirement for IAQ-Load Calculations (Manually using E-20 form)- ESHF, ADP & Air Flow Rate (CFM) Calculation

UNIT V

STATIC PRESSURE CALCULATION: Selection of Motor HP-Selection Fan/Blower RPM-**Hydronic System**-Classification of Water Piping-Pipesizing for chill water system-Fittings used in the HVAC Piping System-Valves used in the HVAC Piping System-Function of Valves-Openings for CHW Pipes passing through Wall-Sectional drawing @ CHW Pipe supports-Pump Head Calculation-Selection of Pump

REFERENCES:

1. HVAC Fundamentals Volume-I / James E. Brumbou / Audel / 4 Edition
2. Fundamentals of HVAC Systems / Robert McDowall / Academic Press / 2007
3. Home Heating & Air Conditioning systems / James Kittle / MGH
4. HVAC Fundamentals / Samuel C. Sugarman / Fairmont Press / 2005.
5. R&AC Hand Book by ISHRAE
6. Ventilation Systems: Design and Performance/ Hazim B. Awbi. / Routledge / 2007.
7. Portable Ventilation Systems Hand Book / Neil McManus / CRC Press / 2000.
8. Design of Industrial Ventilation Systems / John L Alden / Industrial Press / 5 Edition.
9. Industrial Ventilation Applications / ISHRAE Hand Book / 2009.
10. HVAC Hand book / ISHRAE.

Course Outcomes:

- Students will assist in the installations of Heating, Air Conditioning and Refrigeration equipment.
- Perform preventive maintenance on heating and air conditioning systems.
- Students will identify site hazards.
- The student shall understand the principles and working HVAC systems.
- To be able to study and analyze psychrometric chart in refrigeration systems. Develop problem solving skills through the application of thermodynamics.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

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

(R15A0332) PRODUCT DESIGN AND DEVELOPMENT (CORE ELECTIVE–III)

Course Objectives:

- To study the basic concepts of product design and development process.
- To study the applicability of product design and development in industrial applications.
- To acquaint the practical knowledge regarding conceptualization design and development of a new product.
- To study the concepts of Ergonomics in context of the product design has been explained with the help of case studies.
- To understand the fundamental concept of Rapid Prototyping as well the working principles of the basic rapid prototyping techniques

UNIT-I

Introduction: Design theory, design materials, human factors in design, man-machine system, applied ergonomics, characteristics of successful product development, challenges to product development. Development process and product planning: Generic development process, Concept development, product development process flows, product planning process, identify customer needs.

UNIT-II

Product specifications and concept generation: Product specification, steps to establish the target specifications, Concept generation, five step concept generation method, concept selection, concept screening, concept testing, product architecture.

UNIT-III

Product design methods: Creative and rational, clarifying objectives-the objective tree method, establishing functions- the function analysis method, setting requirements – the performance specification method, determining characteristics – the QFD method, generating alternatives – morphological chart method, evaluating alternatives – the weighted objective method, improving details – the value engineering method and design strategies.

UNIT-IV

Design for manufacture: Estimating manufacturing cost, reducing component, assembly and support costs, design for assembly, design for disassembly, design for environment, design for graphics and packaging, effective prototyping – principle and planning.

UNIT-V

Fundamentals of PLM: Product data or Product information, Product lifecycle management concept, Information models and product structures-Information model, the product information (data) model, the product model, Reasons for the deployment of PLM systems.

Enterprise solution with PLM: Use of product lifecycle management systems in different organization verticals, Product development and engineering, Impact of Manufacturing with PLM Challenges of product management in the engineering and manufacturing industry, Life cycle thinking, and value added services and after sales.

TEXT BOOKS:

- 1) K.T.Ulrich and S.D.Eppinger, "Product design and development", Tata McGraw Hill
- 2) Chitale & Gupta, "Product Development", Tata McGraw Hill
- 3) Monks, J. G., "Operations Management", McGraw Hill, 1997.

REFERENCE BOOKS:

- 1) George Dieter, A material and Processing approach, McGraw Hill.
- 2) Kenneth Crow, "Concurrent Engg./Integrated Product Development", DRM Associates, 26/3, Via Olivera, Palos Verdes, CA 90274 (310) 377-569, Workshop Book. Stephen Rosenthal, "Effective Product Design and Development", Business One Orwin, Homewood, 1992, ISBN 1-55623-603-4.
- 3) Stuart Pugh, "Tool Design - Integrated Methods for Successful Product Engineering", Addison Wesley Publishing, New York, NY.

Course Outcomes:

- Ability to select suitable design and development process for a given application.
- Suitable ergonomic principles can be identified for the product development.
- Appropriate standardization method can be used for product and process development.
- Cost estimation methods can be developed to minimize the cost.
- Able to classify and select proper rapid prototyping and reverse engineering techniques for specific technical applications.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

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

(R17A0333) OPERATIONS RESEARCH (CORE ELECTIVE-IV)

Course Objectives:

- Define and formulate linear programming problems and appreciate their limitations.
- Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained and translate solutions into directives for action.
- Conduct and interpret post-optimal and sensitivity analysis and explain the primal-dual relationship.
- Develop mathematical skills to analyze and solve integer programming and network models arising from a wide range of applications.
- Effectively communicate ideas, explain procedures and interpret results and solutions in simulation.

UNIT-I

Introduction: Development – Definition-Operation Research models– applications.

Resource Allocation: Linear Programming Problem Formulation – Graphical solution – Simplex method –Artificial variables techniques -Big-M method

UNIT-II

Transportation Problem: Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.

UNIT-III

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-IV

Replacement Analysis: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

Inventory: Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed

UNIT-V

Sequencing: Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Simulation Languages.

TEXT BOOKS:

1. S.D.Sharma - Operations Research , Kedarnath, Ramnath2015
2. Hiller & Libermann - Introduction to O.R , Mc Graw Hill2011
3. Taha - Introduction to O.R , PHI2010

REFERENCE BOOKS:

1. A.M.Natarajan,P.Balasubramani,A.Tamilarasi-OperationsResearch,Pearson. Education.
2. R.Pannerselvam - Operations Research ,PHI Publications2006
3. J.K.Sharma- Operation Research, MacMilan2010

Course Outcomes:

- Student will be able to identify and develop operational research models from the verbal description of the real system.
- Understand the mathematical tools that are needed to solve optimization problems.
- Develop a report that describes the model and the solving technique, analyse the results and propose recommendations in language understandable in Management Engineering.
- Student will be able to understand Multi-criteria decision techniques, Decision making under uncertainty and risk, Game theory, and Dynamic programming.
- Use mathematical software to solve the proposed simulation models.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

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

(R17A0334) MECHANICAL VIBRATIONS (CORE ELECTIVE-IV)

Course Objectives:

- Fully understand and appreciate the importance of vibrations in mechanical design of machineparts
- To understand the fundamentals of VibrationTheory
- Operate in different vibratory conditions.
- To know about different degrees offreedom.
- Tobeabletomathematicallymodelreal-worldmechanicalvibrationproblems.

UNIT- I

Single degree of freedom systems : Un-damped and damped free vibrations; forced vibrations coulomb damping; Response to excitation; rotating unbalance and support excitation; vibration isolation and transmissibility- Response to Non Periodic Excitations: unit impulse, unit step and unit Ramp functions; response to arbitrary excitations, The Convolution Integral; shock spectrum; System response by the Laplace Transformation method.

UNIT-II

Two degree freedom systems: Principal modes- Un-damped and damped free and forced vibrations; Un-damped vibration absorbers.

UNIT-III

Multi degree freedom systems: Matrix formulation, stiffness and flexibility influence coefficients; Eigen value problem; normal modes and their properties; Free and forced vibration by Modal analysis; Method of matrix inversion; Torsional vibrations of multi- rotor systems and geared systems; Discrete- Time systems.

UNIT-IV

Vibration measuring instruments: Vibrometers, velocity meters & accelerometers.

UNIT-V

Numerical methods: Raleigh's stodola's, Matrix iteration, Rayleigh- Ritz Method and Holzer's methods.

TEXT BOOKS:

1. Mechanical Vibrations/Groover/Nem Chand andBros
2. Elements of Vibration Analysis by Meirovitch, TMH,2001
3. Mechanical Vibrations/Schaum Series/ McGrawHill

REFERENCE BOOKS:

1. Mechanical Vibrations/SSRao/Pearson/2009, Ed4,
2. Vibration problems in Engineering/S.P.Timoshenko.
3. Theory and Practice of Mechanical Vibrations/JSRao&K.Gupta/New Age Intl. Publishers/Revised 2nd Edition.

Course Outcomes:

- Ability to analyze the mechanical model of a linear vibratory system
- To be able to model reciprocating and oscillatory motions of mechanical systems
- To be able to model undamped and damped mechanical systems and structures
- To be able to model single- and multi-degree of freedom systems
- An ability to identify, formulate, and solve engineering problems

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-I Sem

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

(R17A0335) HYDRAULICS AND PNEUMATICS (CORE ELECTIVE-IV)

Course Objectives:

- To provide student with knowledge on the application of fluid power in process, construction and manufacturing industries.
- To study the fundamental principles, design and operation of hydraulic and pneumatic machines, components and systems and their application in recent automation revolution.
- To provide students with an understanding of the fluids and components utilized in modern industrial fluid power system.
- To develop a measurable degree of competence in the design, construction and operation of fluid power circuits.
- To emphasize basic theory, components sizing, construction and function, how to read pneumatics and fluid power circuit diagrams using the correct symbols and troubleshooting techniques.

UNIT-I

Fluid Power Principles And Hydraulic Pumps: Introduction to Fluid power – Advantages and Applications – Fluid power systems – Types of fluids - Properties of fluids and selection – Basics of Hydraulics – Pascal’s Law – Principles of flow - Friction loss – Work, Power and Torque Problems, Sources of Hydraulic power : Pumping Theory – Pump Classification – Construction, Working, Design, Advantages, Disadvantages, Performance, Selection criteria of Linear and Rotary – Fixed and Variable displacement pumps – Problems.

UNIT-II

Hydraulic Actuators and Control Components: Hydraulic Actuators: Cylinders – Types and construction, Application, Hydraulic cushioning – Hydraulic motors - Control Components : Direction Control, Flow control and pressure control valves – Types, Construction and Operation – Servo and Proportional valves – Applications – Accessories : Reservoirs, Pressure Switches – Applications – Fluid Power ANSI Symbols – Problems.

UNIT-III

Hydraulic Circuits And Systems: Accumulators, Intensifiers, Industrial hydraulic circuits – Regenerative, Pump Unloading, Double-Pump, Pressure Intensifier, Air-over oil, Sequence, Reciprocation, Synchronization, Fail-Safe, Speed Control, Hydrostatic transmission, Electro hydraulic circuits, Mechanical hydraulic servo systems.

UNIT-IV

Pneumatic and Electro Pneumatic Systems: Properties of air – Perfect Gas Laws – Compressor – Filters, Regulator, Lubricator, Muffler, Air control Valves, Quick Exhaust Valves, Pneumatic actuators, Design of Pneumatic circuit – Cascade method – Electro Pneumatic System – Elements – Ladder diagram – Problems, Introduction to fluidics and pneumatic logic circuits.

UNIT-V

Trouble Shooting and Applications: Installation, Selection, Maintenance, Trouble Shooting and Remedies in Hydraulic and Pneumatic systems, Design of hydraulic circuits for Drilling, Planning, Shaping, Surface grinding, Press and Forklift applications. Design of Pneumatic circuits for Pick and Place applications and tool handling in CNC Machine tools – Low cost Automation – Hydraulic and Pneumatic power packs.

TEXT BOOKS:

1. Anthony Esposito, "Fluid Power with Applications", Prentice Hall, 2009.
2. James A. Sullivan, "Fluid Power Theory and Applications", Fourth Edition, Prentice Hall, 1997.

REFERENCES:

1. Shanmugasundaram.K, "Hydraulic and Pneumatic Controls". Chand & Co, 2006.
2. Majumdar, S.R., "Oil Hydraulics Systems – Principles and Maintenance", Tata McGRaw Hill, 2001.
3. Majumdar, S.R., "Pneumatic Systems – Principles and Maintenance", Tata McGRaw Hill, 2007.
4. Dudley, A. Pease and John J Pippenger, "Basic Fluid Power", Prentice Hall, 1987
5. Srinivasan.R, "Hydraulic and Pneumatic Controls", Vijay Nicole Imprints, 2008
6. Joshi.P, "Pneumatic Control", Wiley India, 2008.
7. Jagadeesha T, "Pneumatics Concepts, Design and Applications ", Universities Press, 2015.

Course Outcomes:

Upon completion of this course, the students will be able to:

- Identify hydraulic and pneumatic components and its symbol and usage.
- Ability to design hydraulic and pneumatic circuits.
- Identify and analyse the functional requirements of a power transmission system for a given application.
- Ability to visualize how the hydraulic/pneumatic circuit will work to accomplish the function.
- Ability to Design and understand the electro-hydraulic and electro-pneumatic circuits.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech ME - I Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0389) AUTOMATION AND CONTROL ENGINEERING LAB

Course Objectives:

- To learn the different types of system and process controls inAutomation.
 - To identify and study different control system components.
 - To understandsimulation on controllers.
 - To demonstrateworkingofdifferent actuating systems and sensors.
 - To learn and demonstrate IoT.
1. Simulation on P Controller.
 2. Simulation on P+I Controller.
 3. Simulation on P+D Controller.
 4. Simulation of Hydraulic Actuation System.
 5. Simulation of Pneumatic Actuation System.
 6. Simulation on Stepper Motor.
 7. Simulation on Logic gates, decoders and flip-flops.
 8. Determination of Ambient Temperature using Arduino.
 9. Experiment on Photo-resistor and LED using Arduino.
 10. Determination of Temperature using IoT.
 11. Determination of Humidity using IoT.
 12. Experiment on speed control of stepper motor.
 13. Obstacle detection using sensors.
 14. Experiment on assessment of load characteristics of solar panels in series & parallel connection.

Note: Any 10 of the following experiments has to be performed

Course Outcomes:

Students will be able

- To apply the knowledge in real time applications.
- To understand the components of control system.
- To gain knowledge on simulation softwares.
- To work ondifferent actuating systems & sensors.
- To understand technologies like IoT, machine languages.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech ME - I Sem

| | | |
|---|---|---|
| L | P | C |
| 0 | 3 | 2 |

(R17A0390) MECHANICAL MEASUREMENTS AND INSTRUMENTATION LAB

Course Objectives:

- To prepare the students for successful career in industry and motivate for higher education.
- To provide strong foundation in basic science and mathematics necessary to formulate, solve and analyze Control and Instrumentation problems
- To provide strong foundation in circuit theory, control theory and signal processing concepts.
- To provide good knowledge of Instrumentation systems and their applications.
- To provide knowledge of advanced control theory and its application to engineering problems and learn about representation of materials, fits and estimation of limits, tolerances

LIST OF EXPERIMENTS:

1. Calibration of Pressure Gauges
2. Study and calibration of LVDT transducer for displacement measurement.
3. Calibration of strain gauge for temperature measurement.
4. Calibration of thermocouple for temperature measurement.
5. Calibration of capacitive transducer for angular displacement.
6. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
7. Calibration of resistance temperature detector for temperature measurement.
8. Study and calibration of McLeod gauge for low pressure
9. Study and use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.
10. Study and calibration of Rotameter for flow measurement.

Course Outcomes:

- At the end of the course, the student will be able to characterize and calibrate measuring devices.
- Identify and analyze errors in measurement.
- Analyze measured data using regression analysis.
- To understand the Calibration of Pressure Gauge temperature.
- Analyze LVDT, capacitive transducer and rotometer.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

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

(R17A0336) INDUSTRIAL ENGINEERING AND MANAGEMENT (CORE ELECTIVE – V)

Course Objectives:

- To understand the concepts of management and organization structure
- To Remember the plant location and work study objectives and work measurements
- To Create importance of material management and TQM
- To evaluate PERT CPM for various projects
- To apply quality control techniques and to understand functions of HRM

UNIT-I

Concepts of Management and Organisation– Functions of Management – Evolution of Management Thought , Taylor’s Scientific Management, Fayol’s Principles of Management, Douglas Mc-Gregor’s Theory X and Theory Y, Mayo’s Hawthorne Experiments, Herzberg’s Two Factor Theory of Motivation, Maslow’s Hierarchy of Human Needs – Systems Approach to Management.

Designing Organisational Structures : Basic concepts related to Organisation - Departmentation and Decentralization, Types of mechanistic and organic structures of organisation (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-II

Plant location: definition, factors affecting the plant location, comparison of rural and urban sites-methods for selection of plant-Matrix approach. Plant Layout–definition, objectives, types of production, types of plant layout – various data analyzing forms-travel chart.

Work Study: Definition, objectives, method study - definition, objectives, steps involved- various types of associated charts. Work measurement- definition, time study, Work Sampling – definition, steps involved, standard time calculations, differences with time study.

UNIT-III

Materials Management: Objectives, Inventory – functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory Control Systems-Continuous review system-periodical review system. Stores Management and Stores Records. Purchase management, functions of purchase of manager, associated forms.

TQM: Introduction to Total quality management, Gurus of TQM- Historic Review, Benefits of TQM- Leadership, Performance Measures-Basic concept-Strategy-Quality cost- Bench marking-reasons for bench marking-Process.

UNIT-IV

Introduction to PERT / CPM :Project management, Network modeling-probabilistic model, various types of activity times estimation-programme evaluation review techniques- Critical Path-probability of completing the project, deterministic model, critical path method (CPM)-critical path calculation-crashing of simple of networks.

UNIT-V

Inspection and quality control: Types of inspections - Statistical Quality Control-techniques-variables and attributes-assignable and non assignable causes- variable control charts, and R charts, attributes control charts, p charts and c charts. Acceptance sampling plan- single sampling and double sampling plans-OC curves. Introduction to TQM-Quality Circles, ISO 9000 series procedures.

Introduction to Human Resource Management: Functions of HRM, Job Evaluation, different types of evaluation methods. Job description, Merit Rating.- difference with job evaluation, different methods of merit ratings and performance appraisal, wage incentives, different types of wage incentive schemes. Marketing, marketing vs selling, marketing mix, product life cycle.

TEXT BOOKS:

- 1) Amrine, Manufacturing Organization and Management, Pearson, 2nd Edition,2004.
- 2) Industrial Engineering and Management O.P. Khanna DhanpatRai.
- 3) Industrial Engineering andManagement by BUFFA.

REFERENCE BOOKS:

- 1) Stoner,Freeman,Gilbert, *Management*,6thEd,PearsonEducation,NewDelhi,2005.
- 2) Phillip Kotler, Marketing Management, Pearson,2004.
- 3) A.R.Aryasri, Management Science for JNTU (B.Tech), Tata McGraw-Hill,2002.

Course Outcomes:

- The concepts of management and organization structure are understood by students
- The plant location and work study objectives and learned and remembered
- Importance of material management and TQM are known
- Evaluated PERT CPM various techniques for various projects
- Applied quality control techniques and remembered functions of HRM

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

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

(R17A0337) MAINTENANCE AND SAFETY ENGINEERING (CORE ELECTIVE-V)

Course Objectives:

- To ensure the desired plant availability at an optimum cost within the safety prescription.
- Student able to know about the objectives of maintenance.
- To minimize the total cost of unavailability and resources.
- Explain the repair methods of beds and slideways.
- Discuss various condition monitoring techniques.

UNIT-I

Introduction to the Development of Industrial Safety and Management: History and development of Industrial safety: Implementation of factories act, Safety and productivity, Safety organizations. Safety committees and structure, Role of management and role of Govt. in industrial safety.

UNIT-II

Accident Preventions, Protective Equipments and the Acts: Personal protective equipment, Survey the plant for locations, Part of body to be protected, Education and training in safety, Prevention causes and cost of accident, Housekeeping, First aid, Firefighting equipment, Accident reporting, Investigations, Industrial psychology in accident prevention, Safety trials.

UNIT-III

Safety Acts: Features of Factory Act, Introduction of Explosive Act, Boiler Act, ESI Act, Workman's compensation Act, Industrial hygiene, Occupational safety, Diseases prevention, Ergonomics, Occupational diseases, stress, fatigue, health, safety and the physical environment, Engineering methods of controlling chemical hazards, safety and the physical environment, Control of industrial noise and protection against it, Code and regulations for worker safety and health.

UNIT-IV

Principles and Practices of Maintenance Planning: Basic Principles of maintenance planning – Objectives and principles of planned maintenance activity, Sound Maintenance systems – Reliability and machine availability, Equipment Life cycle, Measures for Maintenance Performance: Equipments breakdowns, Mean Time Between Failures and Repair, Factors of availability, Maintenance organization and economics.

UNIT-V

Maintenance Policies and Preventive Maintenance:

Maintenance categories –Merits of each category – Preventive maintenance, Maintenance schedules: Repair cycle, Principles and methods of lubrication, Fault Tree Analysis, Total Productive Maintenance: Methodology and Implementation.

TEXT BOOKS:

- 1) Industrial Maintenance Management Srivastava, S.K. - S. Chand andCo.
- 2) Occupational Safety Management and Engineering Willie Hammer - PrenticeHall
- 3) Installation, Servicing and Maintenance Bhattacharya, S.N. - S. Chand andCo.

REFERENCE BOOKS:

- 1) Occupational Safety Management and Engineering Willie Hammer - PrenticeHall
- 2) Reliability, Maintenance and Safety Engineering by Dr.A.K.Guptha
- 3) A Textbook of Reliability and Maintenance Engineering byAlakeshManna

Course Outcomes:

- Describe the various categories of maintenance.
- Assemble, dismantle and align mechanisms in sequential order.
- Carry out plant maintenance using tribology, corrosion and preventive maintenance.
- Student gets the exposure of Maintenance Policies and Preventive Maintenance.
- Explain the repair methods of material handling equipments.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

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

(R17A0338) NON DESTRUCTIVE TESTING (OPEN ELECTIVE-V)

Course Objectives:

- Overview the concepts, principles, and methods employed for NDT of structures and materials.
- To study and understand the various Non-Destructive Evaluation and Testing methods, theory and their industrial applications.
- Analyze the Thermography and Eddy Current Testing (ET) methods to be carried out on components and surfaces
- Describe ultrasonic method of testing the materials.
- Understand the radiography uses in engineering.

UNIT I:

Overview of NDT: NDT Versus Mechanical testing, Overview of the Non Destructive Testing Methods for the detection of manufacturing defects as well as material characterization. Relative merits and limitations, various physical characteristics of materials and their applications in NDT. Visual inspection – Unaided and aided.

UNIT II:

Surface NDE methods: Liquid Penetrant Testing – Principles, types and properties of liquid penetrants, developers, advantages and limitations of various methods, Testing Procedure, Interpretation of results. Magnetic Particle Testing- Theory of magnetism, inspection materials Magnetization methods, Interpretation and evaluation of test indications, Principles and methods of demagnetization, Residual magnetism.

UNIT III:

Thermography and Eddy Current Testing (ET): Thermography- Principles, Contact and non-contact inspection methods, Techniques for applying liquid crystals, Advantages and limitation – infrared radiation and infrared detectors, Instrumentations and methods, applications. Eddy Current Testing-Generation of eddy currents, Properties of eddy currents, Eddy current sensing elements, Probes, Instrumentation, Types of arrangement, Applications, advantages, Limitations, Interpretation/Evaluation.

UNIT IV:

Ultrasonic Testing (UT) and Acoustic Emission (AE): Ultrasonic Testing-Principle, Transducers, transmission and pulse-echo method, straight beam and angle beam, instrumentation, data representation, A/Scan, B-scan, C-scan. Phased Array Ultrasound, Time of Flight Diffraction. Acoustic Emission Technique –Principle, AE parameters, Applications.

UNIT V:

Radiography Testing (RT): Principle, interaction of X-Ray with matter, imaging, film and film less techniques, types and use of filters and screens, geometric factors, Inverse square, law, characteristics of films – graininess, density, speed, contrast, characteristic curves, Penetrometers, Exposure charts, Radiographic equivalence. Fluoroscopy- Xero-Radiography, Computed Radiography, Computed Tomography.

TEXT BOOKS:

- 1) Baldev Raj, T.Jayakumar, M.Thavasimuthu “Practical Non-Destructive Testing”, Narosa Publishing House,2009.
- 2) Ravi Prakash, “Non-Destructive Testing Techniques”, 1st revised edition, New Age International Publishers,2010

REFERENCE BOOKS:

- 1) ASM Metals Handbook,”Non-Destructive Evaluation and Quality Control”, American Society of Metals, Metals Park, Ohio, USA, 200,Volume-17.
- 2) PaulEMix,“IntroductiontoNon-destructivetesting:atrainingguide”,Wiley,2ndEdition New Jersey,2005
- 3) Charles, J. Hellier,“ Handbook of Nondestructive evaluation”, McGraw Hill, New York 2001.
- 4) ASNT, American Society for Non Destructive Testing, Columbus, Ohio, NDT Handbook,Vol. 1, Leak Testing, Vol. 2, Liquid Penetrant Testing, Vol. 3, Infrared and Thermal Testing Vol. 4, Radiographic Testing, Vol. 5, Electromagnetic Testing, Vol. 6, Acoustic Emission Testing, Vol. 7, UltrasonicTesting.

Course Outcomes:

Upon completion of this course, the students can

- Understandthetheoryofnon-destructivetesting methodsisused fordifferentmaterials.
- AbletousethevariousNon-DestructiveTestingandTestingmethodsunderstandfor defects and characterization of industrialcomponents
- AbilitytorecognizetheThermographyandEddyCurrentTesting(ET)methodson components andsurfaces
- Distinguish between the various NDT test as Ultrasonic and **Acoustic Emission**methods.
- Understand the properties of radiation used inengineering.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

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

(R17A0339) RENEWABLE ENERGY SOURCES (CORE ELECTIVE–VI)

Course Objectives:

- To explain concept of various forms of Non-renewable and renewable energy
- To outline division aspects and utilization of renewable energy sources for both domestic and industrial applications
- To analyze the environmental and cost economic of using renewable energy sources compared to fossil fuels.
- At the end of the course, the students are expected to identify the new.
- Methodologies / technologies for effective utilization of renewable energy sources

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 tilted 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 techniques, solar distillation and drying, Photovoltaic energy conversion.

UNIT - III

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics.

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. OTEC: Principles, utilization, setting of OTEC plants, thermodynamic cycles. Tidal and Wave Energy: Potential and conversion techniques, mini-hydel power plants, their economics.

UNIT - V

Direct Energy Conversion: Need for DEC. Carnot cycle, limitations, Principles of DEC. Thermoelectric generators, Seebeck, Peltier and Joule Thompson 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, principle, faraday's laws, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

- Renewable Energy Sources I Twidell & Weir / Taylor and Francis / 2nd Special Indian Edition.
- Non- conventional Energy Sources / G.D. Rai / Dhanpat Rai and Sons.
- Renewable Energy Resources I Tiwari and Ghosal I Narosa.

REFERENCE BOOKS:

- Energy Resources Utilization and Technologies / Anjaneyulu & Francis/ BS Publications/2012.
- Principles of Solar Energy / Frank Kreith & John F Kreider / Hemisphere Publications.
- Non-Conventional Energy / Ashok V Desai I Wiley Eastern.
- Non-Conventional Energy Systems / K Mittal / Wheeler.
- Renewable Energy Technologies I Ramesh & Kumar / Narosa.

Course Outcomes:

- Understanding of commercial energy and renewable energy sources
- Knowledge in working principle of various energy systems
- Capability to do basic design of renewable energy systems
- Upon completion of this course, the students can be able to identify the new methodologies / technologies for effective utilization of renewable energy sources.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

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

(R17A0340) BIO-MASS ENGINEERING (CORE ELECTIVE–VI)

Course Objectives:

- Gain knowledge on biomass energy.
- Gain knowledge of sustainable energy.
- Gain knowledge on renewable energy policies.
- To have an exposure on the types of biomass, its surplus availability and characteristics.
- Analyze the technologies available for conversion of biomass to energy in terms of its technical competence and economic implications.

UNIT -I

Origin of Biomass: Resources - Classification and characteristics - Techniques for biomass assessment - Application of remote sensing in forest assessment - Biomass estimation.

UNIT -II

Thermochemical Conversion: Different processes - Direct combustion – Incineration – Pyrolysis - Gasification and liquefaction - Economics of thermochemical conversion.

UNIT -III

Biological Conversion: Biodegradation and biodegradability of substrate - Biochemistry and process parameters of biomethanation - Biogas digester types - Digester design and biogas utilization. Biomethanation Process - Economics of biogas plant with their environmental and social impacts - Bioconversion of substrates into alcohol - Methanol & ethanol Production - Organic acids – Solvents - Amino acids - Antibiotics etc.

UNIT-IV

Chemical Conversion: Hydrolysis & hydrogenation - Solvent extraction of hydrocarbons - Solvolysis of wood - Biocrude and biodiesel - Chemicals from biomass

UNIT -V

Power Generation: Utilisation of gasifier for electricity generation - Operation of spark ignition and compression ignition engine with wood gas – Methanol - ethanol & biogas - Biomass integrated gasification/combined cycles systems - Sustainable cofiring of biomass with coal - Biomass productivity - Energy plantation and power programme.

TEXTBOOKS:

1. BioEnergy Technology Thermodynamics and costs, David Boyles, Ellis Hoknood Chichester, 1984.
2. Khandelwal KC, Mahdi SS, Biogas Technology – A Practical Handbook, Tata McGraw Hill, 1986.
3. Bio Energy for Rural Energisation, Mahaeswari, R.C. Concepts Publication, 1997

4. Best Practises Manual for Biomass Briquetting, I R E D A,1997.
5. ThebriquettingofAgriculturalwastesforfuel,ErikssonS.andM.Prior,FAOEnergyand Environment paper,1990.

k. Thermochemical Characterization of Biomass, IyerPVR , M N E S

REFERENCE BOOKS :

- a. BiotechnologyandAlternativeTechnologiesforUtilizationofBiomass,ChakraverthyA
- b. Biogas Systems: Principles and Applications, MitalK.M
- c. Biomass Energy Systems, Venkata Ramana P and SrinivasS.N
- d. GasificationTechnologies,APrimerforEngineersandScientistsRezaiyan.JandN.P. Cheremisinoff.
- e. BiomassGasification–PrinciplesandTechnology, TomBReed, NoyceDataCorporation, 1981.

Course Outcome:

- Students should able to get knowledge on bio-massenergy.
- Students should able to understand the concept Thermo chemicalConversion.
- Students should able to implement BiologicalConversion.
- Students should able to know about ChemicalConversion.
- Student gets a practical understanding on the various biomass energy conversion technologies and its relevance towards solving the present energycrisis.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

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

(R17A0341) ENERGY CONSERVATION AND MANAGEMENT (CORE ELECTIVE–VI)

Course Objectives:

- Understand and analyze the energy data of industries.
- Carry out energy accounting and balancing.
- Conduct energy audit and suggest methodologies for energy savings and utilize the available resources in optimal ways.
- To impart knowledge in the domain of energy conservation.
- To bring out Energy Conservation Potential and Business opportunities across different user segments under innovative business models.

UNIT –I

Introduction: Energy – Power – Past & Present scenario of World; National Energy consumption Data – Environmental aspects associated with energy utilization – Energy Auditing: Need, Types, Methodology and Barriers. Role of Energy Managers. Instruments for energy auditing.

UNIT –II

Electrical Systems: Components of EB billing – HT and LT supply, Transformers, Cable Sizing, Concept of Capacitors, Power Factor Improvement, Harmonics, Electric Motors – Motor Efficiency Computation, Energy Efficient Motors, Illumination – Lux, Lumens, Types of lighting, Efficiency, LED Lighting and scope of Encon in Illumination.

UNIT –III

Thermal Systems: Stoichiometry, Boilers, Furnaces and Thermic Fluid Heaters – Efficiency computation and encon measures. Steam: Distribution & Usage: Steam Traps, Condensate Recovery, Flash Steam Utilization, Insulators & Refractories.

UNIT - IV:

Energy Conservation In Major Utilities: Pumps, Fans, Blowers, Compressed Air Systems, Refrigeration and Air Conditioning Systems – Cooling Towers – D.G. sets.

UNIT V:

Economics: Energy Economics – Discount Rate, Payback Period, Internal Rate of Return, Net Present Value, Life Cycle Costing – ESCO concept.

TEXTBOOKS:

- Energy Manager Training Manual (4 Volumes) available at www.energymanagertraining.com, a website administered by Bureau of Energy Efficiency (BEE), a statutory body under Ministry of Power, Government of India, 2004.

REFERENCES BOOKS :

- Witte.L.C.,P.S.Schmidt,D.R.Brown,“IndustrialEnergyManagementandUtilisation” Hemisphere Publ, Washington,1988.
- Callagh,n,P.W.“DesignandManagementforEnergyConservation”,PergamonPress, Oxford,1981.
- Dryden.I.G.C.,“TheEfficientUseofEnergy”Butterworths,London,1982
- Turner.W.C.,“EnergyManagementHandbook”,Wiley,NewYork,1982.
- Murphy.W.R.andG.Mc KAY,“Energy Management”,Butterworths,London1987.

Course Outcomes:

Upon completion of this course, the students can able to analyze the energy data of industries.

- Students should able to carry out energy accounting andbalancing.
- Students should able to suggest methodologies for energysavings.
- Students can able to analyze the energy data ofindustries.
- Apply knowledge of Energy Conservation Opportunities ina range of contexts.
- Develop innovative energy efficiency solutions and demand managementstrategies.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

| | | |
|---|-------|---|
| L | T/P/D | C |
| 0 | 0 | 4 |

(R17A0392) MINI PROJECT

COURSE OBJECTIVES

- To acquaint with the process of undertaking literature survey/industrial visit and identifying the problem
- To familiarize the process of solving the problem in a group
- To acquaint with the process of applying basic engineering fundamentals in the domain of practical applications
- To inculcate the process of research
- To work with group and share responsibilities.

COURSE OUTCOMES

- Identify a topic in advanced areas of Mechanical Engineering.
- Review literature to identify gaps and define objectives & scope of the work
- Generate and implement innovative ideas for social benefit.
- Develop conceptual design and methodology of solution for the problem.
- Learn team work and share responsibility.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

| | | |
|---|-------|---|
| L | T/P/D | C |
| 0 | 6 | 2 |

(R17A0393) TECHNICAL SEMINAR

COURSE OBJECTIVES

- To survey selected topics addressing issues of science in society today.
- To familiarize with scientific literature.
- To collect information on each topic.
- To assimilate, synthesize and integrate information.
- To organize the information on each topic into an analysis.

COURSE OUTCOMES

- Identify and compare technical and practical issues related to the area of program specialization.
- Outline annotated bibliography of research demonstrating scholarly skills.
- Prepare a well-organized report employing elements of technical writing and critical thinking.
- Demonstrate the ability to describe, interpret and analyze technical issues and develop competence in presenting.
- To effectively communicate by making an oral presentation before an evaluation committee.

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

IV Year B. Tech, ME-II Sem

| | | |
|---|-------|----|
| L | T/P/D | C |
| 0 | 15 | 12 |

(R17A0394) MAJOR PROJECT

COURSE OBJECTIVES

- To provide an opportunity to working group on a topic/problem/ experimentation.
- To encourage creative thinking process.
- To provide an opportunity to analyse and discuss the results to draw conclusions.
- To acquire and apply fundamental principles of planning and carrying out the work plan project through observations, discussions and decision making process.
- To acquire the knowledge to publishing papers in peer reviewed journals/conference proceedings.

COURSE OUTCOMES

- Identify methods and materials to carry out experiments/develop code.
- Reorganize the procedures with a concern for society, environment and ethics.
- Analyse and discuss the results to draw valid conclusions.
- Prepare a report as per recommended format and defend the work.
- Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.