

M.D UNIVERSITY
SCHEME OF STUDIES AND EXAMINATION
M.TECH 2nd YEAR (MECHANICAL ENGINEERING)
SEMESTER 3rd
CBCS Scheme effective from 2017-18

| Sl. No | Course No. | Subject | Teaching Schedule | | | | Examination Schedule (Marks) | | | | Duration of Exam (Hours) | No of hours/ week | |
|--------|------------|---|-------------------|---|---|---------------|------------------------------|--------|-----------|-------|--------------------------|-------------------|--|
| | | | L | T | P | Total credits | Marks of Class works | Theory | Practical | Total | | | |
| 1 | 17MME23C1 | Tribology & Maintenance Engineering | 4 | 0 | - | 4 | 50 | 100 | - | 150 | 3 | 4 | |
| 2 | 17MME23C2 | Robotics and Automation | 4 | 0 | - | 4 | 50 | 100 | - | 150 | 3 | 4 | |
| 3 | 17MME23C3 | Major Project (Dissertation Stage 1) | - | - | 4 | 4 | 100 | - | - | 100 | | 4 | |
| 4 | 17MME23CL1 | Tribology & Maintenance Engineering Lab | - | - | 2 | 2 | 50 | - | 50 | 100 | | 2 | |
| 5 | | Open Elective | | | | 3 | | | | | | | |
| | | TOTAL | | | | | 19 | | | | | | |

NOTE:

Examiner will set nine questions in total. Question One will be compulsory and will comprises of all sections and remaining eight questions to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each Unit.

OPEN ELECTIVE

A candidate has to select this paper from the pool of open electives provided by the University.

M.D UNIVERSITY
SCHEME OF STUDIES AND EXAMINATION
M.TECH 2nd YEAR (MECHANICAL ENGINEERING)
SEMESTER 4th
CBCS Scheme effective from 2017-18

| Sl. No | Course No. | Subject | Teaching Schedule | | | | Examination Schedule (Marks) | | | | No of Credits |
|--------|------------|--------------------------------------|-------------------|---|---|-------|------------------------------|--------|------------|------------|---------------|
| | | | L | T | P | Total | Marks of Class works | Theory | Practical | Total | |
| 1. | 17MME24C1 | Major Project (Dissertation Stage 2) | - | - | - | - | 250 | - | 500 | 750 | 20 |
| | | TOTAL | - | - | - | - | 250 | - | 500 | 750 | |

NOTE:

1. Students have to publish a research paper in a journal / conference of the research work done in the semester.

17MME23C1 TRIBOLOGY & MAINTENANCE ENGINEERING

L T P CREDIT

SESSIONAL:50

Marks

4 0 0 4

THEORY :100 Marks

TOTAL :150 Marks

DURATION OF EXAM. :3 Hrs.

UNIT-1

Engineering Tribology

Tribological system, Tribology in industries, friction and wear, lubricants and lubrication, fundamental of bearings, nano Tribology ,Introduction part of friction, theories of friction, adhesion theory of friction and its drawbacks, stick-slip theory of friction, friction measurement methods.

Unit-2

Wear, lubricants and bearings

Cause, effect, classification and mechanism of wear, quantitative laws of wear, wear and wear rate, objective and properties of lubricants, synthetic lubricants, reasons of degradation of lubricating oils ,lubricant additives, boundary lubrication, hydrodynamic lubrication, mechanism of elastohydrodynamic lubrication, classification of bearings, hydrostatic bearings, hydrodynamic bearings

UNIT-3

Maintenance Management

Relevance of maintenance, maintenance: an over view, maintenance services, problems of the plant manager, automation and maintenance, maintenance objectives and costs, quality and quality circle in maintenance, Engineering reliability, maintainability Maintenance Types/systems

Planned and unplanned maintenance, breakdown, corrective, opportunistic, routine, preventive, predictive, CBM, Design out maintenance

Unit -4

Condition monitoring

NDT concepts, visual and temperature monitoring, leakage monitoring, vibration monitoring, lubricant monitoring-methods, equipments, ferrography, spectroscopy, cracks monitoring, thickness monitoring, corrosion monitoring.

Books:

Engineering Tribology by Choudhary

Maintenance planning and control- Kelly, A. Buttersworth & Co. 1984

Maintenance and spare parts Management – Krishanan G, Prentice Hall – 1991

17MME23CL1

TRIBOLOGY & MAINTENANCE ENGINEERING LAB

L T P CREDIT
0 0 3 1.5

Sessional:50 Marks
Practical :100 Marks
Total :100 Marks
Duration of Exam. :3 Hrs.

List of Experiments.

1. To study the introduction to maintenance techniques. preventive and predictive Maintenance
2. To study and perform Non-Destructive Testing techniques , liquid dye penetrant and leak testing.
3. To study and perform Eddy current testing & Ultrasonic testing .
4. To study and perform Magnetic particle detection and Particle counter.
5. To study wear Analysis through thermography and Ferrography.
6. To study and perform Pin on wear disc apparatus
7. To study wear, lubricants and bearings
8. to study and perform on Journal bearing apparatus,hydrodynamic and hydrostatic bearing apparatus.

17MME23C2

ROBOTICS AND AUTOMATION

| | | |
|---|---|---|
| L | T | P |
| 4 | 0 | 0 |

UNIT-1

Introduction to Robot Technology: Robot Physical configuration, basic Robot motions.

Types of Manipulators: Constructional features, advantages and disadvantages of various kinematic structures, servo and Non- servo manipulator. Actuators and Transmission System: Pneumatic, Hydraulic and Electrical actuators and their characteristics and control systems.

Feed Back Systems and Sensors: Encoders and other feed back systems, vision, ranging systems, textile sensors.

UNIT-2

Programming Languages: Description of VAN, RAIL and other Languages. Artificial Intelligence: Logged Locomotion, Expert system. Concept of spatial description and transformations, manipulator Kinematics; Inverse manipulator, Kinematics Jacobians; velocities and static forces; manipulator dynamics, position control of manipulators, force control of manipulators, robot programming languages and systems. Concept of automation in Industry, mechanisation and automation classification of automation systems.

UNIT-3

Air Cylinders- their design and mountings, pneumatic and hydraulic valves, flow control valves metering valves, direction control valves, hydraulic servo systems, pneumatic safety and remote control circuits.

UNIT-4

Basis of Automated work piece handling: Working principles and techniques, job orienting and feeding devices. Transfer mechanisms automated feed out of components, performance analysis.

Assembly automation, automatic packaging and automatic Inspection.

Books:

CAD/CAM by Groover and Elinners (Jr.) CAD/CAM Handbook, Bedford Masschusettes.

Automation Production Systems & Computer Aided Manufacturing. Robotics for Engineers by Royen MIT Press.

Robot Manipulators by Paul MIT Press. Robotics by Hall & Hall.

Robot Motion by Brady MIT Press.

Numerical Controlled Computer Aided manufacturing by Press man and Elinners, John Wiley & sons. New York.

17MME23C3

**MAJOR PROJECT
(DISSERTATION STAGE-1)**

| | | | Marks | Credits -4 |
|---|---|---|------------------|------------|
| L | T | P | | |
| - | | 4 | Sessional Exam : | 100 |

A candidate has to prepare a report covering identification of research topic, literature review, planning of research scheme and systematic documentation. The marks will be given on the basis of a report prepared and presentation given by the candidate covering the above said contents, contents of the presentation, communication and presentation skills.