

Indira Gandhi University, Meerpur, Rewari
SCHEME OF STUDIES AND EXAMINATION
M.TECH. (Mechanical)
SEMESTER 3rdt and 4th



Scheme effective from 2020-21

INDIRA GANDHI UNIVERSITY, MEERPUR REWARI

SCHEME OF STUDIES AND EXAMINATION M.TECH 2nd YEAR (MECHANICAL ENGINEERING) SEMESTER 3rd

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	MTME231	Tribology & Maintenance Engineering	4	0	-	4	50	100	-	150	3	4	
2	MTME232	Robotics and Automation	4	0	-	4	50	100	-	150	3	4	
3	MTME233	Major Project (Dissertation Stage 1)	-	-	4	4	100	-	-	100		4	
4	MTME234	Tribology & Maintenance Engineering Lab	-	-	2	2	50	-	50	100		2	
5		Open Elective				3							
6	MTME235	Self Study Paper				1				25			
		TOTAL					20						

NOTE: Examiner will set nine questions in total. Question One will be compulsory and will comprise 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.

INDIRA GANDHI UNIVERSITY, MEERPUR REWARI

SCHEME OF STUDIES AND EXAMINATION
M.TECH 2nd YEAR (MECHANICAL ENGINEERING)
SEMESTER 4th
CBCS Scheme effective from 2018-19

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.	MTME241	Major Project (Dissertation Stage 2)	-	-	-	-	250	-	500	750	20
		TOTAL	-	-	-	-	250	-	500	750	

NOTE:

1. Students have to publish a research paper in a UGC-CARE journal/International Conference of the research work done in the semester.
2. Students will have to submit a soft copy of their thesis with the hard copies.
3. Students have to submit a plagiarism report with the thesis report obtained from Turnitin software. This software is available in IGU Library. Upto 25% of similarity of matter is permitted.

MTME231 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 elasto hydrodynamic 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:

1. Engineering Tribology by Choudhary
2. Maintenance planning and control- Kelly, A. Buttersworth & Co. 1984
3. Maintenance and spare parts Management – Krishanan G, Prentice Hall – 1991

MTME234

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, hydro dynamic and hydrostatic bearing apparatus.

MTME232

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, RAI and other Languages. Artificial Intelligence: Logged Locomotion, Export 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, mechanization 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:

1. CAD/CAM by Groover and Elinmiers (Jr.) CAD/CAM Handbook, Bedford Masschusettes. Automation Production Systems & Computer Aided Manufacturing. Robotics for Engineers by Royen MIT Press.
2. Robot Manipulators by Paul MIT Press. Robotics by Hall & Hall.
3. Robot Motion by Brady MIT Press.
4. Numerical Controlled Computer Aided manufacturing by Press man and Elinmiers, John Wiley & sons. New York.

MTME233

**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.

