

**M.D UNIVERSITY**  
**SCHEME OF STUDIES AND EXAMINATION**  
**M.TECH 2nd YEAR (MANUFACTURING & AUTOMATION)**  
**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	17MMA23C1	Advanced metrology and calibration	4	0	-	4	50	100	-	150	3	4
2	17MMA23C2	Manufacturing Automation	4	0	-	4	50	100	-	150	3	4
3	17MMA23C3	Major Project (Dissertation Stage 1)	-	-	4	4	100	-	-	100		4
4	17MMA23CL1	Metrology & Automation Lab	-	-	2	2	50	-	50	100		2
5		Open Elective				3						
		<b>TOTAL</b>	<b>19</b>									

**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.

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**SEMESTER 4th**  
**CBCS Scheme effective from 2017-18**

Sl · N o	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				No of Credits
			L	T	P	Total	Marks of Class works	Theory	Practical	Total	
1.	17MMA24C1	Major Project (Dissertation Stage 2)	-	-	-	-	250	-	500	750	<b>20</b>
		<b>TOTAL</b>	-	-	-	-	<b>250</b>	-	<b>500</b>	<b>750</b>	

NOTE:

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

## 17MMA23C1-ADVANCED METEROLOGY & CALIBRATION

**L T P CREDIT**  
**0 0 0 4**

**SESSIONAL:50**  
**THEORY :100Marks**  
**TOTAL :150 Marks**  
**DURATION OF EXAM. :3 Hrs.**

### UNIT-I

Fundamental deviation and its calculations, effect of tolerance on the fits, effects of electroplating on the fits and its solution, shaft basis and hole basis system and its applications, Go, No-Go gauges design, tolerance position and tolerance for bolt and nut. Geometrical Tolerances.

Surface errors i.e. form, macro and micro errors, reasons for these errors.

Surface texture parameters, amplitude, spacing and hybrid, bearing ratio/ ABBOTT-Fire stone curve, Average Slope

### UNIT- II

Measuring instrument for flatness & surface finishes, instrument for geometrical tolerances, profile projector, co-ordinate measuring machine, laser micrometer, various grades of slip gauges and pin gauges, autocollimators, various types of micrometer

### UNIT- III

Introduction to calibration, calibration of mechanical measuring instruments, micrometers depth-micrometer, vernier caliper, tool maker microscope, pin gauge, surface plate, dial gauges, optical flats, slip gauges.

### UNIT- IV

Calculation of uncertainty, both A type & B type, for micrometers, vernier Calipers and co-ordinate measuring Machine

### Text Books:

1. Engineering Metrology And Instrumentation by R.K. Rajput
2. ISI-Standard 919 and ISI-Standard 4218.
3. Geometrical Tolerances Is:800(Part-I)-1985 ISO 1101-1983
4. Engineering Tolerances by H.G. Conwat

**17MMA23CL1 – Metrology & Automation lab**

**L T P CREDIT**  
**0 0 2 2**

**SESSIONAL:50 Marks**  
**THEORY :50 Marks**  
**TOTAL :100 Marks**  
**DURATION OF EXAM. :3 Hrs.**

1. Measurements using Optical Projector/Toolmaker Microscope.
2. Measurement of alignment using Autocollimator/Roller set
3. Measurement of cutting tool forces using
  - a) Lathe tool Dynamometer
  - b) Drill tool Dynamometer.
4. Measurements of Surface roughness, Using Tally Surf/Mechanical Comparator
5. Study and application of Hydraulics software.
6. Study and application of Pneumatic software.
7. Study and application of Robotics software.
8. Study and application of PLC software.
9. To design an automated part feeder.

## 17MMA23C2-MANUFACTURING AUTOMATION

L T P CREDIT  
Marks  
0 0 0 4

SESSIONAL:50

THEORY :100 Marks  
TOTAL :150 Marks  
DURATION OF EXAM. :3 Hrs.

### UNIT-1

**Introduction:** Automation in Production System, Principles and Strategies of Automation, Basic Elements of an Automated System, Advanced Automation Functions, Levels of Automations, introduction to automation productivity.

**Material handling systems:** Overview of Material Handling Systems-Rotary feeders, oscillating force feeder, vibratory feeder, elevator type and Centrifugal type feeders, Principles and Design Consideration, Material Transport Systems, Storage Systems.

### UNIT-2

**Automated Manufacturing Systems:** Components, Classification and Overview of Manufacturing Systems, Manufacturing Cells, GT and Cellular Manufacturing, FMS, FMS and its Planning and Implementation, Flow lines & Transfer Mechanisms, Fundamentals and Analysis of Transfer Lines, product design for automatic assembly.

**Control Technologies in Automation:** Industrial Control Systems, Process Industries Verses Discrete-Manufacturing Industries, Continuous Verses Discrete Control, Computer Process and its Forms. Sensors, Actuators and other Control System Components.

### UNIT-3

**Evaluation of automatic production:** product manufacturability, orientation devices- active and passive devices, parts orientation and escapement.

**Pneumatic and hydraulic components and circuits:** Boolean algebra, pneumatic sensors and amplifiers, jet destruction devices, logic devices, schmitt triggering devices, developing pneumatic circuits for automatic die casting machine.

### UNIT-4

**Modeling and Simulation for manufacturing Plant**

**Automation:** Introduction/need for system Modeling, Building Mathematical Model of a manufacturing Plant, Modern Tools- Artificial neural networks in manufacturing automation, AI in manufacturing, Fuzzy decision and control, robots and application of robots for automation.

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### **REFERENCEBOOKS:**

1. Handbookofdesign,manufacturing and Automation:R.C. Dorf,JohnWileyandSons.
2. Automation,ProductionSystemsandComputerIntegrated Manufacturing,M.P.Groover,PearsonEducation.
3. IndustrialAutomation:W.P.David,JohnWileyandSons.
4. ComputerBasedIndustrialControl,KrishnaKant,EEE-PHI
5. AnIntroduction toAutomatedProcess Planning Systems, Tiess ChiuChang&RichardA.Wysk
6. ManufacturingassemblyHandbook:-BrunoLotter
7. AnatomyofAutomation,AmberG.H&P.S.Amber,PrenticeHall.
8. PerformanceModelingofAutomatedManufacturingSystems, Viswanandham,PHI.
9. AutomaticprocesscontrolsystemandHardware-R.P. Hunter,PrenticeHall.

**17MMA23C3**

**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.