

# LESSON PLAN

## DEPARTMENT OF MECHATRONICS ENGINEERING, ITT, CHOUDWAR

**SUBJECT:** Mechatronics System & Advance Manufacturing

**Periods:** 4 per week

**SEMESTER:** 4<sup>th</sup>

**NAME OF FACULTY:** P.K MOHANTY

**ACADEMIC YEAR.**2019-2020

**Semester From date:** 09.12.2019

**To Date:** 30.03.2020

**No. of weeks:** 15

Week	Class Day	Theory / Practical Topics
1 <sup>st</sup>	1 <sup>st</sup>	Introduction to Mechatronics, mechatronics system measurement system
	2 <sup>nd</sup>	Control system, microprocessor based controllers
	3 <sup>rd</sup>	Mechatronics in manufacturing product
	4 <sup>th</sup>	Conventional vs Mechatronics
2 <sup>nd</sup>	1 <sup>st</sup>	Mechatronics elements, introduction, machine structure
	2 <sup>nd</sup>	Guide ways- Classification, friction & anti friction guide ways
	3 <sup>rd</sup>	Other guide ways
	4 <sup>th</sup>	Drive system- Servo principle, servo motor, drive optimization
3 <sup>rd</sup>	1 <sup>st</sup>	Drive protection, selection criteria for drives
	2 <sup>nd</sup>	Power supply for CNC, electric panel cooling
	3 <sup>rd</sup>	Mechanical transmission system, mechanism to convert rotary motion to the linear motion.
	4 <sup>th</sup>	Torque transmission elements.
4 <sup>th</sup>	1 <sup>st</sup>	Spindle bearing and antifriction bearing
	2 <sup>nd</sup>	Hydrostatic bearing and hydrodynamic bearing
	3 <sup>rd</sup>	Direct and indirect measuring system
	4 <sup>th</sup>	Tool monitoring & changing system
5 <sup>th</sup>	1 <sup>st</sup>	Introduction to guide ways – Lm guideways, tychoways, rolling elements, aerostatic
	2 <sup>nd</sup>	Hydrostatic guideways- the assembly precautions
	3 <sup>rd</sup>	Ball screw & nut- assembly technique alignment, fitting and displacement.
	4 <sup>th</sup>	Feedback elements- Preferred linear scale assembly, incremental encoder
6 <sup>th</sup>	1 <sup>st</sup>	Assembly care of mounting of proximity switch
	2 <sup>nd</sup>	Spindle bearing-general assembly precautions, misalignment, noise and vibrations.
	3 <sup>rd</sup>	Data presentation system, loading & data presentation elements.
	4 <sup>th</sup>	Magnetic recordings & data acquisition system.
7 <sup>th</sup>	1 <sup>st</sup>	Displays
	2 <sup>nd</sup>	Data acquisition systems
	3 <sup>rd</sup>	Actuation system, hydraulic actuation system
	4 <sup>th</sup>	Pneumatic actuation systems, cylinders
8 <sup>th</sup>	1 <sup>st</sup>	Process control valves
	2 <sup>nd</sup>	Example of fluid control system rotary actuators, types of motion
	3 <sup>rd</sup>	QRM
	4 <sup>th</sup>	Cams- gear trains
9 <sup>th</sup>	1 <sup>st</sup>	Ratchet & Pawl.
	2 <sup>nd</sup>	Bearings- plain journal bearing- Ball & roller bearing-selection of bearing.
	3 <sup>rd</sup>	Mechanical aspects of motor selection- moment of inertia torque.
	4 <sup>th</sup>	Electrical systems- mechanical switches

10 <sup>th</sup>	1 <sup>st</sup>	Solid state switches.
	2 <sup>nd</sup>	Control of D.C motor control
	3 <sup>rd</sup>	Stepper motor control
	4 <sup>th</sup>	Linear systems-pneumatics rams rod & rod less type.
11 <sup>th</sup>	1 <sup>st</sup>	Electrical actuators, Solenoid & other forms of electrical actuators.
	2 <sup>nd</sup>	Pneumatic motor
	3 <sup>rd</sup>	Pneumatic motor
	4 <sup>th</sup>	Continuous and limited rotations
12 <sup>th</sup>	1 <sup>st</sup>	Continuous and limited rotations
	2 <sup>nd</sup>	Cellular manufacturing, introduction types and its benefits
	3 <sup>rd</sup>	Cell layout and design
	4 <sup>th</sup>	Cell layout and design
13 <sup>th</sup>	1 <sup>st</sup>	Application
	2 <sup>nd</sup>	Flexible manufacturing system, introduction, benefits meaning.
	3 <sup>rd</sup>	FMS- major elements and there role
	4 <sup>th</sup>	FMS-Layout concepts, system
14 <sup>th</sup>	1 <sup>st</sup>	Tool handling system, material handling principle & system
	2 <sup>nd</sup>	Revision
	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Revision
15 <sup>th</sup>	1 <sup>st</sup>	Revision
	2 <sup>nd</sup>	Revision
	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Revision