



GOVERNMENT POLYTECHNIC DARLIPALI, SUNDARGARH

ସରକାରୀ ବହୁବୃତ୍ତି ଅନୁଷ୍ଠାନ ଦଲିପାଲି, ସୁନ୍ଦରଗଡ଼

GOVERNMENT OF ODISHA | ଓଡ଼ିଶା ସରକାର

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DEPARTMENT OF AE&I ENGINEERING

LESSON PLAN(2025-2026)

Discipline: AE&I ENGINEERING		Semester: 3rd	Name of the Teaching faculty: Sidharth Sekhar Mallick	
Subject: Sensors & Actuators Subject Code: AEIEPC205 (TH:3)		No of Days/Week class allotted: 3	Semester from Date: 14/7/2025 to 15/11/2025 No of weeks: 17	No. of Period Available: 45
Month	Week	No of periods available	Class Day Theory topics to be covered	
JULY	1st	3P	Introduction, Syllabus Discussion	
			Unit-1 Introduction to sensors and measurement. 1.1 Overview of measurement systems: Definition of sensor, Difference between sensor, transmitter and transducer; Primary measuring element: selection,	
			1.2 static and dynamic characteristics: Range; Response time; Accuracy; Precision; Sensitivity; Dead band; Dead time; Signal transmission:	
	2nd	3P	1.3 Types of signal: Pneumatic signal; Hydraulic signal; Electronic Signal. Standard signal ranges	
			1.4 Introduction of Electronic transmitter; Pneumatic transmitter; Smart transmitters.	
			1.5 Block diagram of Data Acquisition system and Data Logger.	
	3rd	3P	Unit-2 Principles of various Sensors: 2.1 Classification of sensors. Characteristics and calibration of different sensors	
			2.2 Working Principle of Displacement, Position and Motion sensors, Limit switches, Proximity sensors, LVDT, strain gauge, Tacho- generator,. Encoders, Hall sensors, Distance sensors. Light Sensor. Accelerometer, Force, Torque, Tactile sensors, Load cells, Piezoelectric transducer. Continuing...	
			2.2 Working Principle of Displacement, Position and Motion sensors, Limit switches, Proximity sensors, LVDT, strain gauge, Tacho- generator,. Encoders, Hall sensors, Distance sensors. Light Sensor. Accelerometer, Force, Torque, Tactile sensors, Load cells, Piezoelectric transducer. Continuing...	
AUGUST	4th	3P	2.2 Working Principle of Displacement, Position and Motion sensors, Limit switches, Proximity sensors, LVDT, strain gauge, Tacho- generator,. Encoders, Hall sensors, Distance sensors. Light Sensor. Accelerometer, Force, Torque, Tactile sensors, Load cells, Piezoelectric transducer. Continuing...	

			2.2 Working Principle of Displacement, Position and Motion sensors, Limit switches, Proximity sensors, LVDT, strain gauge, Tacho- generator, Encoders, Hall sensors, Distance sensors. Light Sensor. Accelerometer, Force, Torque, Tactile sensors, Load cells, Piezoelectric transducer.
			2.3 Principle of Piezo Resistive Type; Variable Capacitive Type; Variable reluctance type sensors. Humidity and moisture sensor, pH sensor. Continuing...
	5th	3P	2.3 Principle of Piezo Resistive Type; Variable Capacitive Type; Variable reluctance type sensors. Humidity and moisture sensor, pH sensor. Continuing...
			2.3 Principle of Piezo Resistive Type; Variable Capacitive Type; Variable reluctance type sensors. Humidity and moisture sensor, pH sensor.
			2.4 Synchros and resolvers.
	6th	3P	Revision Unit-1 & 2
			Class Test-I
SEPTEMBER			Unit-3 Pressure and level measuring elements: 3.1 Bourden tube, Bellows; Diaphragm.
	7th	1P	3.2 Application of Diaphragm: Capacitance Type, Reluctance Type, Strain Gauge Type and Inductive Type.
	8th	3P	3.3 Application of Bellows: Electrical and Piezoelectric pressure transducers,
			3.4 McLeod gage, Pirani gage and Ionisation gage.
			3.5 Level sensors: Float type, Variable resistive type, Inductive type, Capacitive type. Continuing...
	9th	3P	3.5 Level sensors: Float type, Variable resistive type, Inductive type, Capacitive type.
			Revision Unit-3
			Class Test-II
	10th	3P	Unit-4 Flow and temperature measuring elements: 4.1 Flow sensors: Reynolds numbers; Types of Flow meters and principle of flow measurement:
			4.2 Differential pressure type: orifices; venturi tubes; flow tubes; flow nozzles; pitot tubes; and Rotameter, Nutating disk & Rotary-vane types. Continuing...
OCTOBER			Internal Assessment-I
	11th	3P	Internal Assessment-I
			4.2 Differential pressure type: orifices; venturi tubes; flow tubes; flow nozzles; pitot tubes; and Rotameter, Nutating disk & Rotary-vane types.
			4.3 Velocity meters: Turbine; Vortex shedding; Electromagnetic and Mass flowmeters, Anemometer, Ultrasonic flow meter. Continuing...
	12th	2P	4.3 Velocity meters: Turbine; Vortex shedding; Electromagnetic and Mass flowmeters, Anemometer, Ultrasonic flow meter.
			4.4 Temperature sensors: Thermocouples, Thermistor, RTD, Pyrometer
	13th	3P	Revision Unit-4
			Class Test-III
			Unit-5 Actuators : 5.1 Definition and Example; selection; Types of Actuators; 5.2 Pneumatic actuator; Electro-Pneumatic actuator; cylinder, rotary actuators

	14th	2P	Internal Assessment-II
			Internal Assessment-II
	15th	3P	Mechanical actuating system: 5.3 Hydraulic actuator; Control valves: Construction; Valve coefficient or valve sizing; valve characteristics; types of valves; valve selection. Continuing...
			Mechanical actuating system: 5.3 Hydraulic actuator; Control valves: Construction; Valve coefficient or valve sizing; valve characteristics; types of valves; valve selection. 5.4 Electrical actuating systems: Solid-state switches, Solenoids, Voice Coil; Electric Motors; Principle of operation and its application: D.C motors - AC motors - Single phase & 3 Phase Induction Motor; Synchronous Motor; Stepper motors - Piezoelectric Actuator. Continuing...
NOVEMBER	16th	2P	5.4 Electrical actuating systems: Solid-state switches, Solenoids, Voice Coil; Electric Motors; Principle of operation and its application: D.C motors - AC motors - Single phase & 3 Phase Induction Motor; Synchronous Motor; Stepper motors - Piezoelectric Actuator.
			Revision Unit-5
	17th	3P	Quiz Test
			Revision & Previous year question & answer discussion
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