

Marks	Grade Point	Letter Grade	Marks	Grade Point	Letter Grade
80>	4.00	A+	55-59	2.75	B-
75-79	3.75	A	50-54	2.50	C+
70-74	3.50	A-	45-49	2.25	C
65-69	3.25	B+	40-44	2.00	D
60-64	3.00	B	0-39	0.00	F

Daffodil Polytechnic Institute, Institute Code: 50238
Lesson Plan – Academic session: March 23- August 23

Subject Teacher : MD.Badeuzzamal Sarker (Instructor)
 Subject Name : INSTRUMENTATION AND PROCESS CONTROL
 Subject Code : 66863
 Technology : Electrical
 Semester : 7th
 Reference Book : Instrumentation and process control
 (Publisher: Haque Publication)

Mark Distribution (for 150 Marks)			
Theory Marks		Practical Marks	
Midterm	10	PC	25
Class test	10	PF	25
Quiz and presentation	10	-	-
Final	120	-	-
Total	150	Total	50

Objectives

To provide the student with an opportunity to acquire knowledge, skill and attitude in the area of instrumentation and process control with special emphasis on:

- transducer
- signal conditioning
- measuring techniques of special quantities
- data acquisition
- control theory
- application of process control
- Recorders.

SHORT DESCRIPTION

Transducers; Passive transducer; Self generating type transducer; Measuring technique by transducer; Signal conditioning; Recorders; Measuring techniques of special quantities; Data acquisition; Control theory; Servo control; Application of process control and application of recorders

Learning Segment	Activities	Time
Introduction	Greetings & Attendance	10min
Discussion & Demonstration	Discussion about previous class	15min
Discussion & Demonstration	Discussion & Demonstration	30min
Practice	Practical Sessions	15min
Review	Answering & questioning	10min
Next Class	Discussion & Assignment	10min

Lecture	Chapter	Supporting Equipment	Topic	Benefits
01	Understand the basic features of transducers	Projector, Internet connection https://www.youtube.com/watch?v=hv_h8ZqdXjoE	1. 1.1 State the meaning of transducer and sensor. 1.2 Mention different types of transducer and sensor. 1.3 Describe difference between transducers and sensors 1.3 Describe the parameters of electrical transducer.	1.To know about transducer and sensor.
02	Understand the basic features of transducers	Projector, Internet connection https://www.youtube.com/watch?v=fv-p1xJo1D0	1.4 Describe the factors to be considered in selecting a transducer. 1.5 Describe mechanical devices as primary detector. 1.6 Mention the different electrical phenomena employed in transducers.	1.To know about transducer and sensor.

03	Understand the features of passive transducers.	Projector, Internet connection https://www.youtube.com/watch?v=yQvRqtozC6g	2.1 Describe the operation of different types of resistive transducers. 2.2 Explain the basic principle of strain gauges 2.3 Describe the working principle of resistance thermometer	1.To know about resistance thermometer
04	Understand the features of passive transducers.	Projector, Internet connection https://www.youtube.com/watch?v=qHTpA-U4M5M	2.4 Describe the construction of different types of thermistor. 2.5 Describe the working principle of inductive transducer. 2.6 Explain the operation of differential output transducers.	To know about inductive transducer
05	Understand the features of passive transducers.	Projector, Internet connection https://www.youtube.com/watch?v=WYX0S-dXCSM	2.7 Describe the construction and working principle of linear variable differential transformer (LVDT) 2.8 Describe the construction and working principle of Rotary variable differential transformer (RVDT)	1.To know about LVDT, RVDT
06	Understand the features of passive transducers.	Projector, Internet connection https://www.youtube.com/watch?v=zWyenHxi8uA	2.9 Describe the working principle of pressure inductive transducer. 2.10 Describe the working principle of pressure capacitive transducer.	1.To know about inductive transducer, capacitive transducer.
07	1st quiz Test	Theory Base https://www.youtube.com/watch?v=anCnrtjNLQM	Chapter 1,2	To know about transducer, LVDT, RVDT
08	Understand the features of self-generating type transducers.	Projector, Internet connection https://www.youtube.com/watch?v=omaF2ENBXtA	3.1 Describe the working principle of Piezoelectric transducers 3.2 Explain the basic principle of photo emissive, photoconductive and photo voltaic cell. 3.3 Describe the construction of thermocouples and thermopile	1.To know about photo voltaic cell, thermocouples and thermopile

09	Understand the features of self-generating type transducers.	Projector, Internet connection https://www.youtube.com/watch?v=vbyTp8G-la8	3.4 Describe the working principle of thermocouple and thermopile. 3.5 Describe the concept of digital encoding transducer	To know about thermocouples and thermopile
10	1st Class test	Theory Base	Chapter 2,3	To know about thermocouples and thermopile
11	Understand the features of self-generating type transducers.	Projector, Internet connection https://www.youtube.com/watch?v=pZyS0oj7QQM	3.6. Describe the principle and operation of optical displacement transducer. 3.7 Describe the principle and operation of photo optic transducer.	To know about photo optic transducer
12	Understand the measuring technique by transducers.	Projector, Internet connection https://www.youtube.com/watch?v=MbXSmJQ-mDQ	4.1 Describe the weight measuring technique by load cell (pressure cell). 4.2 Explain the basic principle of resistance temperature detector (RTD). 4.3 Explain the basic principle of reluctance pulse pick-up.	To know about RTD, reluctance pulse pick-up.
13	Understand the measuring technique by transducers.	Projector, Internet connection https://www.youtube.com/watch?v=LHNDUfjArSY	4.4 Describe the working principle of magnetic flow meter. 4.5 Describe the sound intensity measurement technique by capacitor microphone. 4.6 Describe the liquid level measurement technique by dielectric gauge.	To know about capacitor microphone.
14	Understand the measuring technique by transducers.	Projector, Internet connection https://www.youtube.com/watch?v=Dvl7OieCbxs	4.7 Describe the torque measurement technique by magnetostriction gauge. 4.8 Explain synchro system. 4.9 Describe the angular displacement measurement technique by synchro system.	To know synchro system.
15	Understand the concept of signal conditioning	Projector, Internet connection https://www.youtube.com/watch?v=HSHJXXFigz8	5.1 Describe signal conditioning system with block diagram. 5.2 Explain the basic principles of DC and AC signal conditioning system.	To know about AC signal conditioning system

16	2nd quiz Test	Theory Base	Chapter 4	To know about synchro system.
17	Understand the concept of signal conditioning	Projector, Internet connection https://www.youtube.com/watch?v=dYKY6n201sk	5.3 Explain the basic principle of data conversion system. 5.4 Describe the operation of an instrumentation amplifier. 5.5 Describe the basic principle of instrumentation system.	To know about instrumentation amplifier
18	Understand the concept of signal conditioning	Projector, Internet connection https://www.youtube.com/watch?v=Y6Kv5cDr3ww	5.6 Describe use of operational amplifier with capacitive displacement transducer. 5.7 Describe radio telemetry with block diagram.	To know about radio telemetry
19	2nd Class test	Theory Base	Chapter 5	To know about instrumentation amplifier
19	Understand the features of recorders.	Projector, Internet connection – https://www.youtube.com/watch?v=RCa4nE6Z-SE	6.1 State the necessity of recorder in instrumentation system. 6.2 State different types of recorders. 6.3 Describe the principle of operation of strip chart recorder	1.To know about strip chart recorder
20	Understand the features of recorders.	Projector, Internet connection https://www.youtube.com/watch?v=FoO6kzd_Ars	6.4 Describe the principle of operation of X-Y recorder (galvanometer and null type). 6.5 Describe the principle of operation of magnetic recorder.	To know about magnetic recorder
Mid Examination				
22	Understand the features of recorders.	Projector, Internet connection https://www.youtube.com/watch?v=QEubAxBfqKU	6.6 Describe the operation of frequency modulation recording. 6.7 Explain the method of recording temperature and sound by strip chart recorder.	To know about frequency modulation recording
23	Understand the measuring techniques of special quantities.	Projector, Internet connection	7.1 Describe the method of Temperature, compensation and cancellation Techniques.	To know about Temperature, compensation and cancellation Techniques

		https://www.youtube.com/watch?v=QEubAxBfqKU	7.2 Describe the method of measurement of pressure using electrical transducer	
24	Understand the measuring techniques of special quantities.	Projector, Internet connection https://www.youtube.com/watch?v=byTp8G-la8	7.3 Describe the method of measurement of torque by using different method such as by inductive transducer, digital method. 7.4 Describe the method of measurement of temperature by using thermometer, thermocouple.	To know about thermometer, thermocouple.
25	3 rd Quiz test	Theory Base	Chapter 6	To know about frequency modulation recording
26	Understand the measuring techniques of special quantities.	Projector, Internet connection https://www.youtube.com/watch?v=QEubAxBfqKU	7.5 Describe the method of measurement of flow by electromagnetic flow meter. 7.6 Describe the method of measurement of humidity by humidity hygrometers	To know about electromagnetic flow meter.
27	3 rd Class test	Theory Base	Chapter 7	To know about torque by using different method
28	Understand the concept of data acquisition	Projector, Internet connection https://www.youtube.com/watch?v=hscfyjZSCVM	8.1 Explain the basic principle of data acquisition system. 8.2 Describe the component of analog and digital data acquisition system	To know about digital data acquisition system
29	Presentation	Laptop, projector	Short presentation by individual student.	Be confident to present what he learn.
30	Understand the concept of data acquisition	Projector, Internet connection https://www.youtube.com/watch?v=e6Z0BjaHxPM	8.2 Describe the principle single channel and multichannel data acquisition system. 8.4 Describe the basic principle of operation of data logger.	To know about data logger
31	4 th quiz Test	theory Base	Chapter 8	To know about data logger
32	Understand the concept of data acquisition	Projector, Internet connection	8.5 Describe the method of data transmission.	To know about recorder in digital system

		https://www.youtube.com/watch?v=e6Z0BjaHxPM	8.6 Describe the digital recording and use of recorder in digital system.	
33	Understand the concept of control theory.	Projector, Internet connection https://www.youtube.com/watch?v=YLGLrEwEiTQ	9.1 Mention the types of control systems. 9.2 Describe the principles of open loop & closed loop control system. 9.3 State the meaning of transfer lag.	To know about open loop & closed loop control system.
34	Understand the concept of control theory.	Projector, Internet connection https://www.youtube.com/watch?v=3mQRsF3SjMU	9.4 Describe two-step & three step control systems. 9.5 Describe proportional, derivative and integral control. 9.6 Explain compound control system such as PI, PD, DI & PID control.	To know about PI, PD, DI & PID control.
35	4th Class test	Theory Base	Chapter 9	To know about PI, PD, DI & PID control.
36	Understand the concept of servo control.	Projector, Internet connection https://www.youtube.com/watch?v=LXURLvga8bQ	10.1 Describe the construction of DC servo, AC servo, stepper motor, electrical modulator, 10.2 Describe the principle of operation of DC servo & AC servo stepper motor, electrical. 10.3 Describe the basic concepts of DC position control with servo system	To know about DC servo & AC servo motor
	Understand the concept of servo control.	Projector, Internet connection https://www.youtube.com/watch?v=eyqwLiowZiU	10.4 Describe the idea of AC position control with synchro sensing element. 10.5 Describe the speed control system for sheet metal processing unit. 10.6 Describe Online and Offline computer control system with block diagram.	To know about synchro sensing element
37	4th Quiz test	Theory Base	Chapter 10	To know about DC servo & AC servo motor
	Understand the different applications of process control.	Projector, Internet connection https://www.youtube.com/watch?v=b1U9W4iNDiQ	11.4 Explain the temperature, speed, pressure and flow control using an analogue electronic controller. 11.5 Describe the injection molding system for plastic, PET, PVC production process with block diagram.	To know about PET, PVC production process with block

38	Review class	Theory Base	Chapter:- 1to 5(Regarding student's problem)	To know about chapter 1to 5
39	Review class	Theory Base	Chapter:6 to 11(Regarding students' problem)	To know about chapter 6 to 11
Final Examination				