

**SRM UNIVERSITY**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**DEPARTMENT OF ICE**

Course Code : EI0463 \_ Instrumentation and Control in Paper Industry  
Course Title : Instrumentation and Control in Paper Industry  
Year& Semester : IV & 8<sup>th</sup> semester  
Course duration : 45 hours  
Location : Tech Park

**Faculty Details :**

Name of the staff	Section	Office	Office Hours	Mail ID
S.Stella jenifer isbella	ICE- A, B	TECH PARK	8:45am to 4.00 pm	stella.heavenofglory@gmail.com

**Reference Books**

- Liptak, Bela G, Instrumentation in the Processing Industries, Chilton Publishers,1973Considine
- D. M., Process/Industrial Instruments and control Handbook, McGraw Hill, 4thedition 1993.
- Robert H. Perry, Green D.W. and Maloney J.O., Perry's Chemical Engineers, Handbook, McGraw HillInc, New York, 7th ed, 1998

**Prerequisite :**

To provide a window of applications of instrumentation and automation in processing industries

**Objective:**

To introduce students to the basics of Paper Industry

To study about the various analyzer and control methods.

To study the application of instrumentation and automation in processing industries.

To Identify of various process parameters in the industries.

Have cases world-class mills employing IT-enabled applications

**Tentative test details and portions:**

- Cycle Test-I : Unit I and II
- Cycle Test-II : Unit III and IV
- Model Exam : Unit I to Unit V

**Assessment details:**

Cycle test I	10 points
Cycle test II	10 points
Surprise test	10 points
Model Exam	20 points
TOTAL	50 Points

**Outcomes**

Students who have successfully completed this course

Course outcome	Program outcome
<ul style="list-style-type: none"><li>• Familiar with the basics of Paper Industry.</li><li>• Familiar with the design of Analyzers and control loops used in Paper Industry.</li><li>• Identification of various process parameters in the industry.</li></ul>	<ul style="list-style-type: none"><li>• The students will be able to design a Special applications for controls.</li><li>• The students will be able to design the instrumentation required for the Paper Industry.</li><li>• The students will be able to Evolution of computer applications in the industry and SCADA, DDC, PLC and DCS design.</li></ul>

**Detailed Session Plan**

Day	Name of the topics	Reference	
1	Role of paper in various forms in the civilized world, history of paper making	Liptak B.G., Instrumentation in Process Industries, Chilton, 1973	
2	per-capita consumption of paper and board in India and in other countries		
3	Process description in diagrammatic and functional block details		
4	Conventional and non-conventional raw materials for paper manufacture.		
5	Various grades of paper; properties of paper.		
6	Different pulping processes, importance of kraft process		
7	continuous and batch digesters		
8	Subject discussion		
9	brown stock washers, bleaching plant		
10	chemical recovery process		Robert H. Perry, Green D.W. and Maloney J.O., Perry's Chemical Engineers, Handbook, McGraw Hill Inc, New York, 7th ed, 1998
11	paper machine operations, conversion processes		
12	Pulping process involves various chemical processes		
13	impact of effluents and need for treatment and disposal		
14	Paper making is addition and removal of water		
15	process water, DM water and potable water		
16	water treatment plant		
17	Cogeneration Plant for steam and power generation.		
18	Subject discussion		
19	Identification of various process parameters in the industry		
20	selection of suitable measurement hardware for flow	<ul style="list-style-type: none"> <li>D. M., Process/Industrial Instruments and control Handbook, McGraw Hill,</li> </ul>	
21	pressure, level, temperature		
22	density, solids, consistency		

23	pH, ORP, conductivity	<p>4thedition 1993.</p> <ul style="list-style-type: none"> <li>A.K. Sawhney, A course in Electrical and Electronics Measurement and Instrumentation, Dhanpat Raj and sons, New Delhi, 1999.(R4)</li> </ul>
24	Special gauges for measurement of basis weight	
25	Moisture and caliper.	
26	Subject discussion	
27	Surprise test 1	
28	Control room layout for mill operations	<ul style="list-style-type: none"> <li>D. M., Process/Industrial Instruments and control Handbook, McGraw Hill, 4thedition 1993.</li> </ul>
29	graphic displays	
30	alarm management	
31	Special applications for controls	
32	Digester blow tank controls	
33	digester liquor feed pump control	
34	brown stock washer level control	
35	dissolving tank density control, white liquor classifier density control	
36	white liquor flow control; condensate conductivity control	
37	Dryer temperature control.	
38	Basis weight control, web moisture control	
39	Evolution of computer applications in the industry	
40	Review of data logging	
41	SCADA, DDC	
42	PLC and DCS	
43	Computer controls for online basis weight and web moisture in modern mills.	
44	Subject discussion	
45	Surprise test 2	