



# GOVERNMENT POLYTECHNIC DARLIPALI, SUNDARGARH

ସରକାରୀ ବହୁବୃତ୍ତି ଅନୁଷ୍ଠାନ ଦଲିପାଲି, ସୁନ୍ଦରଗଡ଼

GOVERNMENT OF ODISHA | ଓଡ଼ିଶା ସରକାର

A/ P: Darlipali , NTPC Darlipali ,Dist.: Sundargarh, Odisha- 758001

Website: <https://gpdarlipali.org.in/> in E-mail: gpdarlipali24@gmail.com

## DEPARTMENT OF AE&I ENGINEERING

### LESSON PLAN: –Summer-2026(2025-26)

| Discipline: AE&I ENGINEERING                                       |      | Semester: 4 <sup>th</sup>         | Name of the Teaching faculty: Sidharth Sekhar Mallick                                                                                                                    |                                                                                                   |
|--------------------------------------------------------------------|------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Subject: Process Instrumentation<br>Subject Code: AEIEPE204 (TH:5) |      | No of Days/Week class allotted: 3 |                                                                                                                                                                          | Semester from Date: 22/12/2025 to 18/04/2026<br>No of weeks: 14<br>Available: 42<br>No. of Period |
| Month                                                              | Week | No of periods available           | Class Day<br>Theory topics to be covered                                                                                                                                 |                                                                                                   |
| DECEMBER                                                           | 1st  | 3P                                | Introduction & Syllabus Discussion                                                                                                                                       |                                                                                                   |
|                                                                    |      |                                   | Introduction to Process Instrumentation:                                                                                                                                 |                                                                                                   |
|                                                                    |      |                                   | 1.1 Elements of process parameter measurement systems and their functions                                                                                                |                                                                                                   |
|                                                                    | 2nd  | 3P                                | 1.2 Characteristics of Process instruments and their classifications                                                                                                     |                                                                                                   |
|                                                                    |      |                                   | 1.3 Application of Various Process Instruments: Indicators, Recorders, Process switches, Alarms, Sensors, Transducers, Converters etc.                                   |                                                                                                   |
|                                                                    |      |                                   | 1.4 Instrumentation Diagrams: Process and Instrument diagrams, Loop Diagrams, Functional Diagrams.                                                                       |                                                                                                   |
| JANUARY                                                            | 3rd  | 3P                                | Characteristics of Process systems:                                                                                                                                      |                                                                                                   |
|                                                                    |      |                                   | 2.1 Mathematical Modeling of processes                                                                                                                                   |                                                                                                   |
|                                                                    |      |                                   | 2.2 First order and second order process systems                                                                                                                         |                                                                                                   |
|                                                                    |      |                                   | 2.3 Process Load, Process Lag: Dead time , Transfer time lag                                                                                                             |                                                                                                   |
|                                                                    |      |                                   | 2.4 Self-Regulation Property of processes                                                                                                                                |                                                                                                   |
|                                                                    | 4th  | 2P                                | 2.5 Batch and continuous processes                                                                                                                                       |                                                                                                   |
|                                                                    |      |                                   | 2.6 Various Process control techniques                                                                                                                                   |                                                                                                   |
|                                                                    |      |                                   | Revision Chapter-1 & 2                                                                                                                                                   |                                                                                                   |
|                                                                    | 5th  | 3P                                | Class Test-1                                                                                                                                                             |                                                                                                   |
|                                                                    |      |                                   | Signal Conditioning:                                                                                                                                                     |                                                                                                   |
|                                                                    |      |                                   | 3.1 Relevance of signal conditioning in process instrumentations.                                                                                                        |                                                                                                   |
|                                                                    |      |                                   | 3.2 Principles of analog signal conditioning. Brief idea on signal level & bias changing, linearization, conversions, filtering & impedance matching. Concept of loading |                                                                                                   |
|                                                                    | 5th  | 2P                                | 3.3 Passive signal conditioner: voltage divider, Wheatstone bridge circuit, RC filter                                                                                    |                                                                                                   |

|          |      |    |                                                                                                                     |
|----------|------|----|---------------------------------------------------------------------------------------------------------------------|
| FEBRUARY |      |    | 3.4 Active signal conditioner: Idea on op amp based circuit: I/P, P/I, I/V, V/I, F/V, V/F converters.               |
|          | 6th  | 3P | 3.5 Instrumentation Amplifier, Charge amplifier, & their importance                                                 |
|          |      |    | Revision Chapter-3                                                                                                  |
|          |      |    | Class Test-2                                                                                                        |
|          | 7th  | 3P | <b>Data Processing:</b>                                                                                             |
|          |      |    | 4.1 Necessity of data processing in Instrumentation                                                                 |
|          |      |    | 4.2 Block diagram and explanation of a generalized Data Acquisition System                                          |
|          | 8th  | 3P | 4.3 Objective of DAS                                                                                                |
|          |      |    | 4.4 Signal Conditioning in DAS, Logarithmic conversion                                                              |
|          |      |    | <b>1<sup>ST</sup> INTERNAL ASSESSMENT</b>                                                                           |
| MARCH    | 9th  | 3P | <b>1<sup>ST</sup> INTERNAL ASSESSMENT</b>                                                                           |
|          |      |    | 4.5 Single channel and multichannel DAS                                                                             |
|          |      |    | 4.6 Block diagram explanation, characteristics of Data Logger                                                       |
|          | 10th | 1P | 4.7 Comparison between DAS and Data Logger                                                                          |
|          |      |    | Revision Chapter-4                                                                                                  |
|          |      |    | Class Test-3                                                                                                        |
|          | 11th | 3P | <b>Final Control Element:</b>                                                                                       |
|          |      |    | 5.1 Actuators. Valve actuators                                                                                      |
|          |      |    | 5.2 Different types of On Off and regulating Control Valve                                                          |
|          | 12th | 3P | 5.3 Explanation and use of I/P converter, positioned, Air Filter Regulator, Purge Regulator (constant DP regulator) |
|          |      |    | 5.4 Idea on Control valve Characteristics, Cv, value selection & sizing , cavitation, flashing, rangeability        |
|          |      |    | 5.5 Specification of Control Valve                                                                                  |
| APRIL    | 13th | 2P | <b>2<sup>ND</sup> INTERNAL ASSESSMENT</b>                                                                           |
|          |      |    | <b>2<sup>ND</sup> INTERNAL ASSESSMENT</b>                                                                           |
|          |      |    | 5.6 Installation of Control valve with manifolds.                                                                   |
|          | 14th | 3P | Revision Chapter-5                                                                                                  |
|          |      |    | Class Test-4                                                                                                        |
|          | 15th | 2P | Revision & Previous year question & answer discussion                                                               |
|          |      |    | Revision & Previous year question & answer discussion                                                               |

  
 Prepared By-  
 Sidharth Sekhar Mallick  
 Lect. Stage-II(AE&I)  
 GP,Darlipali

  
 HOD  
 AE&I Engg.  
 GP,Darlipali

  
 Principal  
 GP, Darlipali