

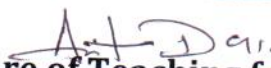
**ASIAN SCHOOL OF TECHNOLOGY, KHORDHA**

**ACADEMIC LESSON PLAN (SUMMER-2026)**

**TH: 1- FUNDAMENTALS OF POWER ELECTRONICS ((COURSE CODE: EEPC202)**

|                                                          |                                                       |                                                                                                  |
|----------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>Discipline:</b><br>ELECTRICAL<br>ENGINEERING          | <b>Semester:4<sup>TH</sup></b>                        | <b>Name of the Teaching Faculty: ANITA DAS</b>                                                   |
| <b>Subject:</b><br>TH1:FUNDAMENTALS OF POWER ELECTRONICS | <b>No.ofdays/per week<br/>class allotted: 3p/week</b> | <b>Semester From :05<sup>th</sup> Jan 2026 to 18<sup>th</sup> April 2026<br/>No.of Weeks: 15</b> |
| <b>WEEK</b>                                              | <b>CLASS DAY</b>                                      | <b>THEORY TOPICS</b>                                                                             |
| 1st                                                      | 1st                                                   | <b>Power Electronic Devices UNIT-1</b><br>1.1 Power electronic devices                           |
|                                                          | 2nd                                                   | 1.2 Power transistor                                                                             |
|                                                          | 3rd                                                   | 1.2.1 construction and working principle<br>1.2.2 V-I characteristics and uses                   |
| 2nd                                                      | 1st                                                   | Solved problems                                                                                  |
|                                                          | 2nd                                                   | 1.3 IGBT                                                                                         |
|                                                          | 3rd                                                   | 1.3.1 Construction and working principle<br>1.3.2 V-I characteristics and uses                   |
| 3rd                                                      | 1st                                                   | 1.4 Concept of single electron transistor (SET) 1                                                |
|                                                          | 2nd                                                   | 1.5 Aspects of Nano- technology(concept only)                                                    |
|                                                          | 3rd                                                   | Solved problems                                                                                  |
| 4th                                                      | 1st                                                   | <b>CLASSTEST/QUIZONTOPICSCOVEREDINUNIT-1</b>                                                     |
|                                                          | 2nd                                                   | <b>Thyristor Family DevicesUNIT-2</b><br>2.1 SCR                                                 |
|                                                          | 3rd                                                   | 2.1.1 Construction of SCR<br>2.1.2 Two transistor analogy of SCR                                 |
| 5th                                                      | 1st                                                   | 2.1.3 Types, working and characteristics                                                         |
|                                                          | 2nd                                                   | 2.1.4 SCR mounting and cooling                                                                   |
|                                                          | 3rd                                                   | 2.2 Types of Thyristors: SCR, LASCR, SCS, GTO, UJT                                               |
| 6th                                                      | 1st                                                   | PUT, DIAC and TRIAC                                                                              |
|                                                          | 2nd                                                   | 2.3 Thyristor family devices<br>2.3.1 Symbol and construction                                    |
|                                                          | 3rd                                                   | 2.3.2 Operating principle 2.3.3 V-I characteristics<br>2.4 Protection circuits                   |
| 7th                                                      | 1st                                                   | 2.4.1 Over-voltage<br>2.4.2 Over-current                                                         |
|                                                          | 3rd                                                   | 2.4.4 Crowbar                                                                                    |

|      |     |                                                                                                                                                                                 |
|------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8th  | 1st | Solved problems                                                                                                                                                                 |
|      | 2nd | <b>CLASSTEST/QUIZONTOPICSCOVEREDINUNIT-2</b>                                                                                                                                    |
|      | 3rd | <b>Turn-on and Turn-off Methods of ThyristorsUNIT-3</b>                                                                                                                         |
|      |     | 3.1 SCR Turn-On methods 3.1.1 High Voltage thermal triggering                                                                                                                   |
| 9th  | 1st | 3.1.2 Illumination triggering                                                                                                                                                   |
|      | 2nd | 3.1.3 dv/dt triggering                                                                                                                                                          |
| 10th | 1st | 3.2.1 Resistance and Resistance-Capacitance circuits                                                                                                                            |
|      | 2nd | 3.3 SCR triggering using UJT                                                                                                                                                    |
|      | 3rd | 3.4 PUT: Relaxation Oscillator and Synchronized UJT circuit                                                                                                                     |
|      |     | 3.5 Pulse transformer and opto-coupler based triggering                                                                                                                         |
| 11th | 1st | 3.6 SCR Turn-Off methods:                                                                                                                                                       |
|      |     | 3.6.1 Class A- Series resonant commutation circuit                                                                                                                              |
|      | 2nd | 3.6.2 Class B-Shunt Resonant commutation circuit                                                                                                                                |
|      | 3rd | 3.6.3 Class C-Complimentary Symmetry commutation circuit                                                                                                                        |
|      |     | 3.6.4 Class D-Auxiliary commutation                                                                                                                                             |
| 12th | 1st | 3.6.5 Class E-External pulse commutation                                                                                                                                        |
|      | 2nd | 3.6.6 Class F-Line or natural commutation                                                                                                                                       |
|      | 3rd | <b>CLASSTEST/QUIZONTOPICSCOVEREDINUNIT-3</b>                                                                                                                                    |
| 13th | 1st | <b>Phase Controlled RectifiersUNIT-4</b>                                                                                                                                        |
|      |     | 4.1 Phase control: firing angle, conduction angle.                                                                                                                              |
|      | 2nd | 4.2 Single phase half controlled, full controlled and midpoint controlled rectifier with R, RL load                                                                             |
|      | 3rd | 4.2.1 Circuit diagram, working, input- output waveforms, equations for DC output and effect of freewheeling diode                                                               |
|      |     | 4.3 Different configurations of bridge controlled rectifiers: Full bridge, half bridge with common anode, common cathode, SCRs in one arm and diodes in another arm             |
| 14th | 1st | <b>CLASSTEST/QUIZONTOPICSCOVEREDINUNIT-4</b>                                                                                                                                    |
|      | 2nd | <b>Industrial Control CircuitsUNIT-5</b>                                                                                                                                        |
|      | 3rd | 5.1 Applications: Burglar's alarm system, Battery charger using SCR, Emergency light system, Temperature controller using SCR and; Illumination control/fan speed control TRIAC |
| 15th | 1st | 5.2 SMPS5.3 UPS: Offline and Online                                                                                                                                             |
|      | 2nd | 5.4 SCR based AC and DC circuit breakers                                                                                                                                        |
|      | 3rd | <b>CLASSTEST/QUIZONTOPICSCOVEREDINUNIT-4</b>                                                                                                                                    |

  
**Signature of Teaching faculty**

**ASIAN SCHOOL OF TECHNOLOGY, KHORDHA**  
**ACADEMIC LESSON PLAN (SUMMER-2026)**

**TH:2- ELECTRIC POWER TRANSMISSION AND DISTRIBUTION (COURSE CODE:EEPC204)**

|                                                                                                                    |                                                       |                                         |                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Discipline:</b><br>ELECTRICAL<br>ENGINEERING                                                                    | <b>Semester :4th</b>                                  | <b>No. of<br/>periods<br/>available</b> | <b>Name of the Teaching Faculty: JAYANTA PANDA</b>                                                                                                                         |
| <b>Subject:TH:2</b><br><b>Electric</b><br><b>Power</b><br><b>Transmission</b><br><b>and</b><br><b>Distribution</b> | <b>No.ofdays/per week class<br/>allotted: 3p/week</b> |                                         | <b>Semester From :05<sup>th</sup> Jan 2026 to 18<sup>th</sup> April 2026</b><br><b>No.ofWeeks: 15</b>                                                                      |
| <b>week</b>                                                                                                        | <b>class day</b>                                      |                                         | <b>Topic to be covered</b>                                                                                                                                                 |
| 1st                                                                                                                | 1                                                     | 1                                       | <b>Introduction about Transmission and Distribution UNIT-1</b>                                                                                                             |
|                                                                                                                    | 2                                                     | 1                                       | 1.1 Single line diagrams with components of the electric supply transmission and distribution systems                                                                      |
|                                                                                                                    | 3                                                     | 1                                       | 1.2 Classification of transmission lines<br>1.3 Primary and secondary transmission                                                                                         |
| 2nd                                                                                                                | 1                                                     | 1                                       | 1.4 Standard voltage level used in India                                                                                                                                   |
|                                                                                                                    | 2                                                     | 1                                       | 1.5 Classification of transmission lines: based on type of voltage, voltage level, length and others                                                                       |
|                                                                                                                    | 3                                                     | 1                                       | 1.6 Characteristics of high voltage for power transmission<br>1.7 Method of construction of electric supply transmission system- 110 kV, 220 kV, 400 kV                    |
| 3rd                                                                                                                | 1                                                     | 1                                       | 1.8 Method of construction of electric supply transmission system- 400 Kv<br>1.9 Method of construction of electric supply distribution systems- 220 V, 400V, 11 kV, 33 kV |
|                                                                                                                    | 2                                                     | 1                                       | 1.10 Method of construction of electric supply distribution systems- 11 kV, 33 Kv                                                                                          |
|                                                                                                                    | 3                                                     | 1                                       | <b>CLASSTEST/QUIZONTOPICSCOVERED</b>                                                                                                                                       |
| 4th                                                                                                                | 1                                                     | 1                                       | <b>Introduction of Transmission Line Parameters and Performance UNIT-2</b>                                                                                                 |
|                                                                                                                    | 2                                                     | 1                                       | 2.1 Line Parameters: Concepts of R, of line parameter and types of lines<br>2.2 Line Parameters: Concepts of L and C of line parameters and types of lines                 |
|                                                                                                                    | 3                                                     | 1                                       | 2.3 Performance of short line: Efficiency, regulation<br>2.4 Performance of short line: its derivation, effect of power factor                                             |
| 5th                                                                                                                | 1                                                     | 1                                       | 2.5 Performance of short line: vector diagram for different power factor<br>2.6 Performance of medium line: representation, nominal 'T' method                             |
|                                                                                                                    | 2                                                     | 1                                       | 2.7 Performance of medium line: representation, nominal ' $\pi$ ' method                                                                                                   |
|                                                                                                                    | 3                                                     | 1                                       | 2.8 Performance of medium line: representation end condenser method                                                                                                        |
| 6th                                                                                                                | 1                                                     | 1                                       | 2.9 Transposition of conductors and its necessity<br>2.10 Skin effect and proximity effect                                                                                 |
|                                                                                                                    | 2                                                     | 1                                       | <b>Introduction of Extra High Voltage Transmission UNIT-3</b>                                                                                                              |
|                                                                                                                    | 3                                                     | 1                                       | 3.1 Extra High Voltage AC (EHVAC) transmission line: Necessity, high voltage substation components such as transformers and other switchgears                              |
| 7th                                                                                                                | 1                                                     | 1                                       | 3.1.1 Advantages, limitations and applications of EHVAC                                                                                                                    |
|                                                                                                                    | 2                                                     | 1                                       | 3.1.2 EHVAC lines in India                                                                                                                                                 |
|                                                                                                                    | 3                                                     | 1                                       | 3.2 Ferranti and Corona effect                                                                                                                                             |
| 8th                                                                                                                | 1                                                     | 1                                       | 3.3 High Voltage DC (HVDC) Transmission Line: Necessity components, advantages, limitations and applications                                                               |
|                                                                                                                    | 2                                                     | 1                                       | 3.3.1 Layout of monopolar, bi-Polar and homo-polar transmission lines of HVDC                                                                                              |
|                                                                                                                    | 3                                                     | 1                                       | 3.3.2 HVDC Lines in India                                                                                                                                                  |
| 9th                                                                                                                | 1                                                     | 1                                       | 3.4 Features of EHVAC and HVDC transmission line                                                                                                                           |

|      |   |   |                                                                                                                                         |
|------|---|---|-----------------------------------------------------------------------------------------------------------------------------------------|
|      | 2 | 1 | 3.5 Flexible AC Transmission line: Features, types of FACTS controller                                                                  |
|      |   |   |                                                                                                                                         |
|      | 3 | 1 | 3.6 New trends in wireless transmission of electrical power                                                                             |
| 10th | 1 | 1 | <b>Introduction about A.C Distribution System UNIT-4</b>                                                                                |
|      | 2 | 1 | 4.1 AC distribution: Components classification, requirements of an ideal distribution system, primary and secondary distribution system |
|      | 3 | 1 | 4.2 Feeder and distributor, factors to be considered in design of feeder and distributor                                                |
| 11th | 1 | 1 | 4.3 Types of different distribution schemes: radial, ring, and grid, layout, advantages, disadvantages and applications                 |
|      | 2 | 1 | 4.4 Voltage drop, sending end and receiving end voltage                                                                                 |
|      | 3 | 1 | 4.5 Distribution Sub-Station: Classification, site selection, advantages, disadvantages and applications                                |
| 12th | 1 | 1 | 4.6 Single Line diagram (layout) of 33/11KV Sub-Station, 11KV/400V sub-station                                                          |
|      | 2 | 1 | 4.7 Symbols and functions of their components                                                                                           |
|      | 3 | 1 | <b>Introduction about Components of Transmission and Distribution Line UNIT-5</b>                                                       |
| 13th | 1 | 1 | 5.1 Overhead Conductors: Properties of material, types of conductor with trade names, significance of sag                               |
|      | 2 | 1 | 5.2 Line supports: Requirements, types of line structures and their specifications, methods of erection                                 |
|      | 3 | 1 | 5.3 Line Insulators,<br>5.3.1 Properties of insulating material ,<br>5.3.2 Selection of material                                        |
| 14th | 1 | 1 | 5.3.3 Types of insulators and their applications                                                                                        |
|      | 2 | 1 | 5.3.4 Causes of insulator failure                                                                                                       |
|      | 3 | 1 | 5.3.5 Derivation of equation of string efficiency for string of three suspension insulator                                              |
| 15th | 1 | 1 | 5.3.6 Methods of improving string efficiency                                                                                            |
|      | 2 | 1 | 5.4 Underground Cables: Requirements, classification, construction, comparison with overhead lines, cable laying and cable jointing.    |
|      | 3 | 1 | <b>CLASSTEST/QUIZ ON TOPICS COVERED</b>                                                                                                 |

*Jayanku Panda*  
Signature of Teaching faculty

# ASIAN SCHOOL OF TECHNOLOGY, KHORDHA

## ACADEMIC LESSON PLAN (SUMMER-2026)

TH-3- AC MACHINES AND SPECIAL ELECTRICAL MACHINES(COURSE CODE :EEPC206)

Discipline: ELECTRICAL ENGG. Semester: 4<sup>TH</sup> Name of Faculty : BHABANI SHANKAR BEHERA

| Subject:TH-3<br>ACMACHINES&SPECIAL<br>ELECTRICAL MACHINES | No. of days/<br>per week<br>Class<br>allotted:<br>3P/week | Semester From :05 <sup>th</sup> Jan 2026 to 18 <sup>th</sup> April 2026<br>No Of Week-15                                                                                                         |
|-----------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week                                                      | Class Day                                                 | Theory                                                                                                                                                                                           |
| 1 <sup>st</sup>                                           | 1 <sup>st</sup>                                           | <b>UNIT1:Introduction of Three Phase Induction Motor</b>                                                                                                                                         |
|                                                           | 2 <sup>nd</sup>                                           | Working principle: production of rotating magnetic field, Synchronous speed, rotor speed and slip                                                                                                |
|                                                           | 3 <sup>rd</sup>                                           | Constructional details of 3 phase induction motors: Squirrel cage induction motor and Slip ring induction motor                                                                                  |
| 2 <sup>nd</sup>                                           | 1 <sup>st</sup>                                           | Rotor quantities: frequency, induced emf, power factor at starting and running condition                                                                                                         |
|                                                           | 2 <sup>nd</sup>                                           | Characteristics of torque versus slip (speed), Torques: starting, full load and maximum with relations among them(numerical)                                                                     |
|                                                           | 3 <sup>rd</sup>                                           | Induction motor as a generalized transformer with phasor diagram. Four quadrant operation, Power flow diagram(numerical)                                                                         |
| 3 <sup>rd</sup>                                           | 1 <sup>st</sup>                                           | Starters: need and types; stator resistance, auto transformer, star delta, rotor resistance and soft starters<br>Speed control methods: stator voltage, pole changing, rotor resistance and VVVF |
|                                                           | 2 <sup>nd</sup>                                           | Motor selection for different applications as per the load torque-speed requirements                                                                                                             |
|                                                           | 3 <sup>rd</sup>                                           | Maintenance of three phase induction motors                                                                                                                                                      |
| 4 <sup>th</sup>                                           | 1 <sup>st</sup>                                           | <b>1. Doubt Clearing class</b><br><b>2. Quiz test</b><br><b>3. Assignment</b>                                                                                                                    |
|                                                           | 2 <sup>nd</sup>                                           | <b>UNIT2: Introduction of Single phase Induction Motors</b><br>Double field revolving theory                                                                                                     |
|                                                           | 3 <sup>rd</sup>                                           | Principle of making single phase induction motors self-start<br>Construction and working of single phase induction motors                                                                        |
| 5 <sup>th</sup>                                           | 1 <sup>st</sup>                                           | Resistance start induction run<br>Capacitor start induction run                                                                                                                                  |
|                                                           | 2 <sup>nd</sup>                                           | Capacitor start capacitor run<br>Shaded pole<br>Repulsion type                                                                                                                                   |
|                                                           | 3 <sup>rd</sup>                                           | Series motor<br>Universal motor                                                                                                                                                                  |
| 6 <sup>th</sup>                                           | 1 <sup>st</sup>                                           | Hysteresis motor<br>Torque-speed characteristics for all of the above motors                                                                                                                     |
|                                                           | 2 <sup>nd</sup>                                           | Motor selection for different applications as per the load torque- speed requirements                                                                                                            |
|                                                           | 3 <sup>rd</sup>                                           | Maintenance of single phase induction motors                                                                                                                                                     |
| 7 <sup>th</sup>                                           | 1 <sup>st</sup>                                           | CLASS TEST                                                                                                                                                                                       |
|                                                           | 2 <sup>nd</sup>                                           | <b>UNIT 3: Three phase Alternators</b><br>Principle of working, moving and stationary armatures                                                                                                  |
|                                                           | 3 <sup>rd</sup>                                           | Constructional details: parts and their functions<br>Rotor constructions                                                                                                                         |

|                  |                 |                                                                                                                       |
|------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------|
| 8 <sup>th</sup>  | 1 <sup>st</sup> | Windings: Single and Double layer                                                                                     |
|                  | 2 <sup>nd</sup> | E.M.F. equation of an Alternator with numerical by considering short pitch factor and distribution factor             |
|                  | 3 <sup>rd</sup> | Alternator loading<br>Factors affecting the terminal voltage of alternator                                            |
| 9 <sup>th</sup>  | 1 <sup>st</sup> | Armature resistance and leakage reactance drops. Armature reaction at various power factors and synchronous impedance |
|                  | 2 <sup>nd</sup> | Armature resistance and leakage reactance drops.                                                                      |
|                  | 3 <sup>rd</sup> | Armature reaction at various power factors and synchronous impedance                                                  |
| 10 <sup>th</sup> | 1 <sup>st</sup> | <b>1. Doubt Clearing class</b><br><b>2. Quiz test</b><br><b>3. Assignment</b>                                         |
|                  | 2 <sup>nd</sup> | <b>UNIT 4: Introduction Synchronous Motors</b><br><b>Principle of working /operation, significance of load angle.</b> |
|                  | 3 <sup>rd</sup> | Torques: starting torque, running torque, pull in torque, pull out torque                                             |
| 11 <sup>th</sup> | 1 <sup>st</sup> | Synchronous motor on load with constant excitation (numerical), effect of excitation at constant load (numerical).    |
|                  | 2 <sup>nd</sup> | Curves and Inverted V-Curves.                                                                                         |
|                  | 3 <sup>rd</sup> | Hunting and Phase swinging.                                                                                           |
| 12 <sup>th</sup> | 1 <sup>st</sup> | Methods of Starting of Synchronous Motor                                                                              |
|                  | 2 <sup>nd</sup> | Losses in synchronous motors and efficiency (no numerical)                                                            |
|                  | 3 <sup>rd</sup> | Applications areas                                                                                                    |
| 13 <sup>th</sup> | 1 <sup>st</sup> | <b>1. Doubt Clearing class</b><br><b>2. Quiz test</b><br><b>3. Assignment</b>                                         |
|                  | 2 <sup>nd</sup> | <b>UNIT 5:</b><br><b>Fractional horse power (FHP) Motors</b>                                                          |
|                  | 3 <sup>rd</sup> | Construction and working<br>Synchronous Reluctance Motor                                                              |
| 14 <sup>th</sup> | 1 <sup>st</sup> | Switched Reluctance Motor<br>BLDC                                                                                     |
|                  | 2 <sup>nd</sup> | Permanent Magnet Synchronous Motors<br>Stepper motors                                                                 |
|                  | 3 <sup>rd</sup> | AC and DC servomotors                                                                                                 |
| 15 <sup>th</sup> | 1 <sup>st</sup> | Torque speed characteristics of above motors                                                                          |
|                  | 2 <sup>nd</sup> | Applications of above motors                                                                                          |
|                  | 3 <sup>rd</sup> | CLASS TEST                                                                                                            |

*Bhabani Shankar Behera*

Signature of Teaching faculty

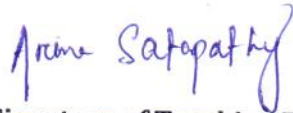
**ASIAN SCHOOL OF TECHNOLOGY, KHORDHA**

**ACADEMIC LESSON PLAN (SUMMER-2026)**

**TH: 4(C) - COMMUNICATION TECHNOLOGIES(COURSE CODE:EEPE202(C))**

|                                                   |                                               |                                                                                                                                                                    |
|---------------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discipline:<br>ELECTRICAL<br>ENGINEERING          | Semester:4 <sup>TH</sup>                      | Name of the Teaching Faculty: ARUNA SATAPATHY                                                                                                                      |
| Subject:TH:4(C)-<br>COMMUNICATION<br>TECHNOLOGIES | No.ofdays/per week class<br>allotted: 3p/week | Semester From :05 <sup>th</sup> Jan 2026 to 18 <sup>th</sup> April 2026<br>No Of Week-15                                                                           |
| WEEK                                              | CLASS DAY                                     | THEORY TOPICS                                                                                                                                                      |
| 1st                                               | 1st                                           | <b>Fundamental of communication and communication system.</b><br>Block diagram of communication system.Types of communication system: synchronous and asynchronous |
|                                                   | 2nd                                           | simplex,half-duplex, Full duplex,                                                                                                                                  |
|                                                   | 3rd                                           | serial and parallel communication                                                                                                                                  |
| 2nd                                               | 1st                                           | Classification of communication technique: AM, FM, & PM on the basis of definition, waveform, bandwidth, modulation index                                          |
|                                                   | 2nd                                           | Continue....                                                                                                                                                       |
|                                                   | 3rd                                           | Modulation and demodulation: Block diagram of AM, FM and PM                                                                                                        |
| 3rd                                               | 1st                                           | continue                                                                                                                                                           |
|                                                   | 2nd                                           | Pulse Modulation: Block diagram for waveform generation of PAM                                                                                                     |
|                                                   | 3rd                                           | Generation of PWM                                                                                                                                                  |
| 4th                                               | 1st                                           | Generation of PPM                                                                                                                                                  |
|                                                   | 2nd                                           | Advantages and disadvantages of PAM,PWM,PPM                                                                                                                        |
|                                                   | 3rd                                           | Digital Modulation Techniques<br>Digital Communication: Block diagram and working principle                                                                        |
| 5th                                               | 1st                                           | waveforms,<br>strength and limitations of digital communication                                                                                                    |
|                                                   | 2nd                                           | Sampling process Nyquist sampling theorem,<br>quantization process,                                                                                                |
|                                                   | 3rd                                           | quantization error, quantization noise.                                                                                                                            |
| 6th                                               | 1st                                           | <b>PCM: Block diagram, working principle</b>                                                                                                                       |
|                                                   | 2nd                                           | waveforms, advantages,<br>disadvantages, application of PCM                                                                                                        |
|                                                   | 3rd                                           | Principle of ASK, PSK, FSK                                                                                                                                         |
| 7th                                               | 1st                                           | Application of ASK, PSK, FSK                                                                                                                                       |
|                                                   | 2nd                                           | <b>Data Communication Media. Baud rate, Bit rate</b>                                                                                                               |
|                                                   | 3rd                                           | types of errors in data communication                                                                                                                              |
| 8th                                               | 1st                                           | error correction techniques,                                                                                                                                       |
|                                                   | 2nd                                           | frequency band of operation,Types of communication media                                                                                                           |
|                                                   | 3rd                                           | Guided media: Types of cable-twisted pair cable ,co-axial cable                                                                                                    |

|      |     |                                                                                                           |
|------|-----|-----------------------------------------------------------------------------------------------------------|
| 9th  | 1st | fiber optic cable ,Unguided media: Microwave communication, Infrared communication                        |
|      | 2nd | Fibre Optics<br>Introduction to Fibre optic communication. Strength and limitations of fiber optic system |
|      | 3rd | Light propagation: reflection, refraction, Snell's law                                                    |
| 10th | 1st | Light propagation through cable: Mode of propagation, index profile                                       |
|      | 2nd | <b>Fibre optic cables: cable construction, fibre optics cable modes</b>                                   |
|      | 3rd | single mode, step index fibre, multimode index fibre                                                      |
| 11th | 1st | <b>multimode graded index fibre, fibre cable losses.</b>                                                  |
|      | 2nd | Light source and Detector: Light emitting diode (LED), Photo Transistor                                   |
|      | 3rd | Laser diode, optocouple                                                                                   |
| 12th | 1st | Data Communication Protocols and Interfacing Standard                                                     |
|      | 2nd | OSI (Open Systems Interconnection) Reference model ,Introduction to protocol                              |
|      | 3rd | <b>Introduction to FTP, SMTP, TCP/IP, UDP, LAN standards</b>                                              |
| 13th | 1st | Introduction to IEEE Standards for LAN and GPIB                                                           |
|      | 2nd | RS-232 standard: Introduction, and working principle                                                      |
|      | 3rd | Network topologies, introduction star, ring, tree, bus, mesh, hybrid                                      |
| 14th | 1st | Basic functions of networking devices: modem, switches, routers, repeaters,hubs.                          |
|      | 2nd | bridges, gateway.                                                                                         |
|      | 3rd | Advanced Data Communication<br>Introduction to Wi-Fi and Wi- Max                                          |
| 15th | 1st | Bluetooth architecture and its layers,                                                                    |
|      | 2nd | Universal serial bus (USB) architecture.                                                                  |
|      | 3rd | Bluetooth and USB                                                                                         |

  
Signature of Teaching Faculty

# ASIAN SCHOOL OF TECHNOLOGY, KHORDHA

## ACADEMIC LESSON PLAN (SUMMER-2026)

TH:5(C)- INDUSTRIAL INSTRUMENTATION AND CONDITION MONITORING (COURSE CODE :EEPE204(C))

| Discipline: ELECTRICAL ENGG. Semester: 4 <sup>TH</sup> Name of Faculty : BHABANI SHANKAR BEHERA |                                                       |                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subject:<br>TH:5(C)INDUSTRIAL<br>INSTRUMENTATION<br>&CONDITION<br>MONITORING                    | No. of days/per<br>week Class<br>allotted:<br>3P/week | Semester From :05 <sup>th</sup> Jan2026 to 18 <sup>th</sup> April 2026<br>No Of Week-15                                                                                                            |
| Week                                                                                            | Class Day                                             | Theory                                                                                                                                                                                             |
| 1 <sup>st</sup>                                                                                 | 1 <sup>st</sup>                                       | <b>UNIT1:Fundamentals of instrumentation</b>                                                                                                                                                       |
|                                                                                                 | 2 <sup>nd</sup>                                       | Basic purpose of instrumentation. Basic block diagram (transduction, signal conditioning, signal presentation) and their function.                                                                 |
|                                                                                                 | 3 <sup>rd</sup>                                       | Construction, working and application of switching devices- Push button, limit switch, float switch, pressure switch, thermostat, electromagnetic relay.                                           |
| 2 <sup>nd</sup>                                                                                 | 1 <sup>st</sup>                                       | 1. Doubt Clearing class<br>2. Quiz test<br>3. Assignment                                                                                                                                           |
|                                                                                                 | 2 <sup>nd</sup>                                       | <b>UNIT 2: Transducers</b>                                                                                                                                                                         |
|                                                                                                 | 3 <sup>rd</sup>                                       | Distinguish between Primary and Secondary, Electrical and Mechanical, Analog and Digital,                                                                                                          |
| 3 <sup>rd</sup>                                                                                 | 1 <sup>st</sup>                                       | Active and Passive. Mechanical devices pry. And sec. transducers Advantages of electric transducers Required characteristics of transducers.                                                       |
|                                                                                                 | 2 <sup>nd</sup>                                       | Factors affecting the choice of transducers Construction and principle of resistive transducer-Potentiometer –variac and strain gauges -No derivation.                                             |
|                                                                                                 | 3 <sup>rd</sup>                                       | Only definition and formula for gauge factor Types of strain gauges like unbonded, bonded and semiconductor.                                                                                       |
| 4 <sup>th</sup>                                                                                 | 1 <sup>st</sup>                                       | Construction and principle of Inductive transducers-L.V.D.T. and R.V.D.T, their applications.                                                                                                      |
|                                                                                                 | 2 <sup>nd</sup>                                       | Construction, principle and applications of transducers – Piezo-Electric transducer, photoconductive cells, photo voltaic cells.                                                                   |
|                                                                                                 | 3 <sup>rd</sup>                                       | 1. Doubt Clearing class<br>2. Quiz test<br>3. Assignment                                                                                                                                           |
| 5 <sup>th</sup>                                                                                 | 1 <sup>st</sup>                                       | <b>UNIT 3:Measurement of Non-Electrical Quantities</b>                                                                                                                                             |
|                                                                                                 | 2 <sup>nd</sup>                                       | Temperature measurement - Construction and Working of RTD, Thermistor and Thermocouple, radiation pyrometer, technical specifications and ranges.                                                  |
|                                                                                                 | 3 <sup>rd</sup>                                       | Pressure measurement – Construction and working of bourdon tube, bellow diaphragm and strain gauge,                                                                                                |
| 6 <sup>th</sup>                                                                                 | 1 <sup>st</sup>                                       | Combination of diaphragm and inductive transducer, Bourdon tube and LVDT, bellow and LVDT, diaphragm capacitance and bridge Circuit.                                                               |
|                                                                                                 | 2 <sup>nd</sup>                                       | Construction and Working of Speed Measurement by contacting and non-Contact Type- DC tachometer, photo- electric tachometer, toothed rotor tachometer Generator - magnetic pickup and Stroboscope. |
|                                                                                                 | 3 <sup>rd</sup>                                       | Construction and Working of Vibration measurement by accelerometer - LVDT accelerometer, Piezo electric type.                                                                                      |
| 7 <sup>th</sup>                                                                                 | 1 <sup>st</sup>                                       | Construction and Working of Flow measurement by electromagnetic and Turbine Flow meter.                                                                                                            |
|                                                                                                 | 2 <sup>nd</sup>                                       | Construction and Working of Liquid level measurement by resistive, inductive, Capacitive gamma rays and Ultrasonic methods.                                                                        |
|                                                                                                 | 3 <sup>rd</sup>                                       | Construction and Working of Thickness measurement by resistive, inductive, capacitive, ultrasonic and Nuclear methods.                                                                             |
| 8 <sup>th</sup>                                                                                 | 1 <sup>st</sup>                                       | 1. Doubt Clearing class<br>2. Quiz test<br>3. Assignment/ <u>CLASS TEST</u>                                                                                                                        |
|                                                                                                 | 2 <sup>nd</sup>                                       | <b>UNIT 4:Signal Conditioning</b>                                                                                                                                                                  |
|                                                                                                 | 3 <sup>rd</sup>                                       | Basic Concept of signal conditioning System. Draw pin configuration of IC 741.                                                                                                                     |
| 9 <sup>th</sup>                                                                                 | 1 <sup>st</sup>                                       | Define Ideal OP-AMPand Electrical Characteristics of OP-AMP. Different Parameters of op-amp:-Input offset voltage, Input offset current, Input bias current,                                       |

|                  |                 |                                                                                                                                                             |
|------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | 2 <sup>nd</sup> | Differential input resistance, CMMR, SVRR, voltage gain, output voltage, slew rate, gain bandwidth. Output, short circuit current.                          |
|                  | 3 <sup>rd</sup> | Use of op-amp as inverting, non- inverting mode, adder, subtractor, and Working of Differential amplifier and instrumentation amplifier.                    |
| 10 <sup>th</sup> | 1 <sup>st</sup> | Filters: Types of RC filters and frequency response -no derivation.                                                                                         |
|                  | 2 <sup>nd</sup> | Sample and hold circuits - operation and its application.                                                                                                   |
|                  | 3 <sup>rd</sup> | 1. Doubt Clearing class<br>2. Quiz test<br>3. Assignment                                                                                                    |
| 11 <sup>th</sup> | 1 <sup>st</sup> | <b>UNIT 5:Data Acquisition System</b> Generalized DAS- Block diagram and description of Transducer, signal conditioner, multiplexer, converter and recorder |
|                  | 2 <sup>nd</sup> | Draw Single Channel and Multi-channel DAS- Block diagram only. Difference between Signal Channel and Multi-Channel DAS.                                     |
|                  | 3 <sup>rd</sup> | Data conversion- Construction and Working of Analog to digital conversion- successive approximation method, ramp type method.                               |
| 12 <sup>th</sup> | 1 <sup>st</sup> | Digital to Analog conversion- Construction and Working of binary weighted resistance method.                                                                |
|                  | 2 <sup>nd</sup> | Concept and methods of data transmission of electrical and electronic transmission.                                                                         |
|                  | 3 <sup>rd</sup> | Construction and principle of telemetry system and its type - Electrical telemetering system-                                                               |
| 13 <sup>th</sup> | 1 <sup>st</sup> | Digital display device- operation and its application of seven segment display, dot matrix display and concept of 3½, 4½ digits, LED and LCD applications   |
|                  | 2 <sup>nd</sup> | 1. Doubt Clearing class<br>2. Quiz test<br>3. Assignment                                                                                                    |
|                  | 3 <sup>rd</sup> | <b>UNIT 6: Condition Monitoring and Diagnostic Analysis</b> Definition of condition monitoring                                                              |
| 14 <sup>th</sup> | 1 <sup>st</sup> | Insulation deterioration Mechanism- factors affecting occurrence and rate of deterioration, types of stresses responsible for deterioration                 |
|                  | 2 <sup>nd</sup> | Different tests on transformer, their purpose, and the necessary condition of machine.                                                                      |
|                  | 3 <sup>rd</sup> | Tests on Circuit breaker, purpose and required condition of machine Tests on CT, purpose, item to be tested and required condition of machine.              |
| 15 <sup>th</sup> | 1 <sup>st</sup> | Power factor, capacitance /tan delta test Insulation and Polarization index, DC winding resistance test, Turns Ratio test                                   |
|                  | 2 <sup>nd</sup> | Tools and equipment used in Condition monitoring                                                                                                            |
|                  | 3 <sup>rd</sup> | 1. Doubt Clearing class<br>2. Quiz test<br>3. Assignment / CLASS TEST                                                                                       |

*Bhaban Shankar Behera*

Signature of Teaching faculty