

**GOVT. POLYTECHNIC KANDHAMAL, (PHULBANI)**

**LESSON PLAN: CIRCUIT THEORY**

**3<sup>RD</sup> – SEMESTER, 2026 (W)**

|                                              |                                               |                                                                                                                                                                                      |
|----------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discipline:<br><b>Electrical Engineering</b> | Semester:<br><b>Winter 2026</b>               | Name of the teaching faculty:<br><b>Bichitrnanda padhiary</b>                                                                                                                        |
| Subject:<br><b>CT</b>                        | No of days/per week class allotted: <b>03</b> | Semester From Date: <b>01.07.2026</b> To Date: <b>05.11.2026</b><br>No of weeks: <b>16</b>                                                                                           |
| Week:                                        | Class day:                                    | Theory/practical topics:                                                                                                                                                             |
| <b>1<sup>ST</sup></b>                        | <b>1<sup>ST</sup></b>                         | <b>UNIT-I( SINGLE PHASE AC SERIES CIRCUIT)</b><br>1.1 Generation of alternating voltage                                                                                              |
|                                              | <b>2<sup>ND</sup></b>                         | 1.2 Phasor representation of sinusoidal quantities                                                                                                                                   |
|                                              | <b>3<sup>RD</sup></b>                         | 1.3 R, L, C circuit elements its voltage and current response                                                                                                                        |
| <b>2<sup>ND</sup></b>                        | <b>1<sup>ST</sup></b>                         | 1.4 R-L, R-C, R-L-C combination of A.C series circuit<br>1.4.1 Impedance, reactance, impedance triangle                                                                              |
|                                              | <b>2<sup>ND</sup></b>                         | 1.4.2 Power factor, active power, reactive power, apparent power<br>1.4.3 Power triangle and vector diagram                                                                          |
|                                              | <b>3<sup>RD</sup></b>                         | 1.4.4 Resonance, Bandwidth                                                                                                                                                           |
| <b>3<sup>RD</sup></b>                        | <b>1<sup>ST</sup></b>                         | 1.4.5 Quality factor and voltage magnification in series R-L, R-C, R-L-C circuit.                                                                                                    |
|                                              | <b>2<sup>ND</sup></b>                         | <b>UNIT-II( SINGLE PHASE AC PARALLEL CIRCUIT )</b><br>2.1 R-L, R-C and R-L-C parallel combination of A.C. circuits<br>2.1.1 Impedance, reactance, phasor diagram, impedance triangle |
|                                              | <b>3<sup>RD</sup></b>                         | 2.1.2 Power factor, active power, apparent power, reactive power, power triangle                                                                                                     |
| <b>4<sup>TH</sup></b>                        | <b>1<sup>ST</sup></b>                         | 2.2 Resonance in parallel R-L,                                                                                                                                                       |
|                                              | <b>2<sup>ND</sup></b>                         | 2.2 Resonance in parallel R-C,                                                                                                                                                       |
|                                              | <b>3<sup>RD</sup></b>                         | 2.2 Resonance in parallel R-L-C,                                                                                                                                                     |
| <b>5<sup>TH</sup></b>                        | <b>1<sup>ST</sup></b>                         | 2.3 Bandwidth                                                                                                                                                                        |
|                                              | <b>2<sup>ND</sup></b>                         | 2.3 Quality factor and voltage magnification                                                                                                                                         |
|                                              | <b>3<sup>RD</sup></b>                         | Simple numerical and revision                                                                                                                                                        |
| <b>6<sup>TH</sup></b>                        | <b>1<sup>ST</sup></b>                         | <b>UNIT-III (THREE PHASE CIRCUIT)</b><br>3.1 Phasor and complex representation of three phase supply                                                                                 |
|                                              | <b>2<sup>ND</sup></b>                         | 3.2 Phase sequence and polarity                                                                                                                                                      |

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|                  | 3 <sup>RD</sup> | 3.3 Types of three-phase connections                                                              |
| 7 <sup>TH</sup>  | 1 <sup>ST</sup> | 3.4 Phase and line quantities in three phase star and delta system                                |
|                  | 2 <sup>ND</sup> | 3.5 Balanced and unbalanced load                                                                  |
|                  | 3 <sup>RD</sup> | 3.6 Neutral shift in unbalanced load                                                              |
| 8 <sup>TH</sup>  | 1 <sup>ST</sup> | 3.7 Three phase power, active, reactive and apparent power in star and delta system               |
|                  | 2 <sup>ND</sup> | Revision and simple numerical .                                                                   |
|                  | 3 <sup>RD</sup> | <b>UNIT-IV (NETWORK REDUCTION AND PRINCIPLES OFCIRCUIT ANALYSIS)</b><br>4.1 Source transformation |
| 9 <sup>TH</sup>  | 1 <sup>ST</sup> | 4.2 Star/delta and delta/star transformation                                                      |
|                  | 2 <sup>ND</sup> | 4.3 Mesh Analysis                                                                                 |
|                  | 3 <sup>RD</sup> | 4.4 Node Analysis                                                                                 |
| 10 <sup>TH</sup> | 1 <sup>ST</sup> | Simple numerical and revision                                                                     |
|                  | 2 <sup>ND</sup> | <b>UNIT-V ( NETWORK THEOREMS)</b><br>5.1 Superposition theorem                                    |
|                  | 3 <sup>RD</sup> | Numerical on Superposition theorem                                                                |
| 11 <sup>TH</sup> | 1 <sup>ST</sup> | 5.2 Thevenin's theorem                                                                            |
|                  | 2 <sup>ND</sup> | Numerical on Thevenin's theorem                                                                   |
|                  | 3 <sup>RD</sup> | 5.3 Norton's theorem                                                                              |
| 12 <sup>TH</sup> | 1 <sup>ST</sup> | Numerical on Norton's theorem                                                                     |
|                  | 2 <sup>ND</sup> | 5.4 Maximum power transfer theorem                                                                |
|                  | 3 <sup>RD</sup> | Numerical on Maximum power transfer theorem                                                       |
| 13 <sup>TH</sup> | 1 <sup>ST</sup> | 5.5 Reciprocity Theorem and numerical                                                             |
|                  | 2 <sup>ND</sup> | <b>UNIT-VI( TWO PORT NETWORK)</b><br>6.1 Open Circuit Impedance Parameters                        |
|                  | 3 <sup>RD</sup> | Numerical on Open Circuit Impedance Parameters                                                    |
| 14 <sup>TH</sup> | 1 <sup>ST</sup> | 6.2 Short Circuit Admittance Parameters,                                                          |
|                  | 2 <sup>ND</sup> | 6.2 Transmission Parameters ,                                                                     |
|                  | 3 <sup>RD</sup> | 6.2 Hybrid Parameters                                                                             |

|                  |                 |                                                                                               |
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| 15 <sup>TH</sup> | 1 <sup>ST</sup> | Numerical on Short Circuit Admittance Parameters, Transmission Parameters , Hybrid Parameters |
|                  | 2 <sup>ND</sup> | 6.3 Interrelationship of Two Port Network                                                     |
|                  | 3 <sup>RD</sup> | 6.4 Inter Connection of Two Port Network                                                      |
| 16 <sup>TH</sup> | 1 <sup>ST</sup> | Revision of all Units.                                                                        |
|                  | 2 <sup>ND</sup> | Previous semester question discussion                                                         |
|                  | 3 <sup>RD</sup> | Previous semester question discussion                                                         |

### COURSE OUTCOMES

CO1: Analyze single-phase and three-phase AC circuits using phasor representation, impedance concepts, and resonance principles.

CO2: Apply network reduction techniques (star-delta, source transformation) and circuit theorems (Superposition, Thevenin, Norton, Maximum Power Transfer) to solve complex circuit problems.

CO3: Evaluate two-port network parameters (Z, Y, ABCD, H) and analyze interconnections of two-port networks for practical circuit applications.

  
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