

## ACADEMIC LESSON PLAN FOR WINTER -2023

Dept. of Electronics & Telecommunication,

RKCAT Polytechnic, Balasore

Name of the Faculty: ER.NILADRI BIHARI  
NAYAK

### Th.2 CIRCUIT THEORY

| PERIOD                               | TOPIC COVERED                                                                                                           | DATE | REMARKS |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------|---------|
| UNIT-01<br>TOTAL<br>PERIOD-06<br>1ST | Circuit elements (Resistance, Inductance, Capacitance), Scope of network analysis & synthesis                           |      |         |
| 2ND                                  | Voltage Division & Current Division, Energy Sources                                                                     |      |         |
| 3 <sup>RD</sup>                      | Electric charge, electric current, Electrical energy, Electrical potential, R-L-C parameters, Active & Passive Elements |      |         |
| 4 <sup>TH</sup>                      | Energy Sources, Current and voltage sources and their transformation & mutual inductance                                |      |         |
| 5 <sup>TH</sup> & 6th                | Star – Delta transformation                                                                                             |      |         |
| Unit-02<br>12 periods<br>2 period    | Nodal & Mesh Analysis of Electrical Circuits with simple problem.                                                       |      |         |
| 2 period                             | Thevenin's Theorem, Norton's                                                                                            |      |         |
| 2 period                             | Theorem, Maximum Power transfer                                                                                         |      |         |
| 2 period                             | Theorem, Superposition Theorem,                                                                                         |      |         |
| 2 period                             | Millman Theorem, Reciprocity                                                                                            |      |         |

|                                                   |                                                                                                                                                                                 |  |  |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| 1period                                           | Theorem-Statement, Explanation & applications                                                                                                                                   |  |  |
| 1period                                           | Solve numerical problems of above                                                                                                                                               |  |  |
| Unit-03<br>12periods<br>2periods                  | Definition of frequency, Cycle, Time period, Amplitude, Average value, RMS value, Instantaneous power & Form factor, Apparent power, Reactive power, power Triangle of AC Wave. |  |  |
| 2periods                                          | Phasor representation of alternating quantities                                                                                                                                 |  |  |
| 2periods                                          | Single phase Ac circuits-Behaviors of A.C. through pure Resistor, Inductor & Capacitor.                                                                                         |  |  |
| 2periods                                          | DC Transients-Behaviors of R-L, R-C, R-L-C series circuit & draw the phasor diagram and voltage triangle                                                                        |  |  |
| 2periods                                          | Define Time Constant of the above Circuit<br>Solve numerical simple problems of above Circuit.                                                                                  |  |  |
| 2periods                                          | Solve numerical problems of above                                                                                                                                               |  |  |
| <b>Unit-4:</b><br>Total period-<br>10<br>2periods | Introduction to resonance circuits & Resonance tuned circuit,                                                                                                                   |  |  |
| 2periods                                          | Series & Parallel resonance                                                                                                                                                     |  |  |
| 2periods                                          | Expression for series                                                                                                                                                           |  |  |
| 2periods                                          | resonance, Condition for Resonance, Frequency of Resonance, Impedance, Current, Voltage, power, Q Factor and Power Factor of Resonance,                                         |  |  |

|                                                    |                                                                                                                                                                   |  |  |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| 1periods                                           | Bandwidth in term of Q.<br>Parallel Resonance (RL, RC& RLC)& derive the expression                                                                                |  |  |
|                                                    | Comparisons of Series & Parallel resonance& applications                                                                                                          |  |  |
| 1Periods                                           | simple problems of above Circuit                                                                                                                                  |  |  |
| <b>Unit-5:</b><br>TOTAL-08<br>1 <sup>ST</sup> &2ND | Introduction to resonance circuits & Resonance tuned circuit,<br>Series& Parallel resonance                                                                       |  |  |
| 3RD<br>&4THND                                      | Expression for series resonance, Condition for Resonance,<br>Frequency of Resonance,                                                                              |  |  |
| 5 <sup>TH</sup> &6TH                               | Impedance, Current, Voltage, power, Q Factor and Power Factor<br>of Resonance, Bandwidth in term of Q.<br>Parallel Resonance (RL, RC& RLC)& derive the expression |  |  |
| 7 <sup>TH</sup> &8TH                               | Comparisons of Series & Parallel resonance& applications<br>simple problems of above Circuit                                                                      |  |  |
| Unit-5<br>TOTAL-08<br>4periods                     | Laplace Transformation, Analysis and derive the<br>equations for circuit parameters of Step response of R-L,<br>R-C &R-L-C                                        |  |  |
| 4periods                                           | Analysis and derive the<br>equations for circuit parameters of Impulse response of R-L,<br>R-C, R-L-C                                                             |  |  |
| Unit-06<br>Total-05<br>1 <sup>st</sup>             | Network elements, ports in Network (One port, two port),                                                                                                          |  |  |
| 2 <sup>nd</sup>                                    | Network Configurations (T & pie).                                                                                                                                 |  |  |
| 3rd                                                | Open circuit (Z-Parameter)& Short Circuit(Y-Parameter)<br>Parameters- Calculate open &short Circuit Parameters for Simple<br>Circuits & its conversion            |  |  |
| 4 <sup>th</sup>                                    | h- parameter (hybrid parameter) Representation<br>Define T-Network & pie – Network                                                                                |  |  |

|                                 |                                                                                                                                                    |  |  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| 5 <sup>th</sup>                 | Define T-Network & pie – Network                                                                                                                   |  |  |
| Unit-07<br>Total-07<br>3periods | Ideal & Practical filters and its applications, cut off frequency, passband and stop band.                                                         |  |  |
| 02periods                       | Classify filters- low pass, high pass, band pass, band stop filters & study their Characteristics.<br>Butterworth Filter Design                    |  |  |
| 2periods                        | Attenuation and Gain, Bel , Decibel & neper and their relations.<br>Attenuators & its applications. Classification-T- Type & PI – Type attenuators |  |  |