# BHUBANANANDA ORISSA SCHOOL OF ENGINEERING, CUTTACK

## Lesson Plan of Sidharth Sekhar Mallick, Lecturer in AE&I

( Winter-2024 )

## VISION & MISSION OF APPLIED ELECTRONICS & INSTRUMENTATION ENGINEERING DEPARTMENT

### VISION OF THEDEPARTMENT:-

To produce efficient professional in applied electronics & instrumentation engineering and other allied area's with update technical knowledge to meet the challenges of society in relevant sector.

### MISSION OF THE DEPARTMENT:-

- To provide the student competent in applied electronics and instrumentation engineering with societal, environmental and human values through quality education, training.
- Provide knowledge of basic science, applied mathematics, instrumentation technology and communicative skills to identify and solve problems related to Applied Electronics and Instrumentation engineering.
- To enable the students to acquire various parameter measurement and automatic control technology used for industrial automation and inculcate quality of leadership, mentorship &teamwork in collaboration with parents, alumni & industry.

## PROGRAMME EDUCATIONAL OBJECTIVES:

- To provide students with a solid foundation in basic science, electrical, electronics, instrumentation and interdisciplinary subjects that is necessary to excel in professional career, entrepreneur in future and/or higher education.
- To prepare students to meet the needs and face the challenges of real life as well as industry automation and digitalization in terms of technical, economic and social feasibility.
- To inculcate professionalism, communication skills, attitudes, team work and to adapt to the current trends by engaging in lifelong learning.
- To utilize the technology in domestic, medical, industry and community for proper utilization of instrument for measurement & control.

| Discipline : Applied Electronics & Instrumentation Engineering. | Semester : 3rd | Name of the teaching faculty: Sidharth Sekhar Mallick |
|---|---|---|
| Subject: Circuit Theory | No. of Days/per week class allotted: **04 periods/per week**(MON ,TUE , THU & FRI:- 1 Period each) | Semester From Date:- 01-10-2021 To Date:- 08-01-2022 No. of weeks: **15 weeks** |

| Week | Class Day | Theory Topics |
|---|---|---|
| 1st | 01/10/2021 | Introduction, syllabus discussion and define the vision, mission, PEOS of the department |
| 2nd | 04/10/2021 | Unit-1: CIRCUIT ELEMENTS& ENERGY SOURCES 1.1 Circuit elements (Resistance, Inductance, Capacitance), Scope of network analysis & synthesize |
|  | 05/10/2021 | 1.2 Voltage Division & Current Division, Energy Sources |
|  | 07/10/2021 | 1.3 Electric charge, electric current, Electrical energy, Electrical potential, R-L-C parameters, Active& Passive Elements. |
|  | 08/10/2021 | 1.4 Energy Sources, Current and voltage sources and their transformation & mutual inductance |
| 3rd | 11/10/2021 |  |
|  | 12/10/2021 |  |
|  | 14/10/2021 |  |
|  | 15/10/2021 | Durga Puja Vacation |
|  | 18/10/2021 |  |
| 4th | 19/10/2021 |  |
|  | 21/10/2021 | 1.5 Star – Delta transformation |
|  | 22/10/2021 | Quiz test on unit-1 and important previous year question discussion. |
| 5th | 25/10/2021 | Unit-2: NETWORK THEOREMS (Applications in dc circuits) 2.1 Nodal & Mesh Analysis of Electrical Circuits with simple problem. |
|  | 26/10/2021 | 2.2 Thevenin's Theorem, Norton's Theorem, Maximum Power transfer Theorem, continued. |
|  | 28/10/2021 | 2.2 Superposition Theorem, Millman Theorem, Reciprocity Theorem-Statement, Explanation & applications. |
|  | 29/10/2021 | 2.3 Solve numerical problems of above theorem |
| 6th | 01/11/2021 | Revision on Chapter 1 & 2 |

| Week | Date | Topic |
|---|---|---|
|  | 02/11/2021 | Class Test -1 |
|  | 05/11/2021 | **Unit-3:** Power Relation in AC circuits & Transient Response of passive circuits |
| 7th | 08/11/2021 | 3.1 Definition of frequency, Cycle, Time period, Amplitude, Average value, RMS value, Cont.. |
|  | 09/11/2021 | 3.1 Instantaneous power & Form factor, Apparent power, Reactive power, power Triangle of AC Wave. |
|  |  | 3.2 Phasor representation of alternating quantities |
|  |  | 3.3 Single phase Ac circuits-Behaviours of A.C. through pure Resistor, Inductor & Capacitor. |
|  | 11/11/2021 | 3.4 DC Transients-Behaviors of R-L, R-C, R-L-C series circuit & draw the phasor diagram and voltage triangle. |
|  |  | 3.5 Define Time Constant of the above Circuit |
| 8th | 12/11/2021 | 3.6 Solve numerical simple problems of above Circuit |
|  | 15/11/2021 | **Unit-4:** RESONANCE AND COUPLED CIRCUITS |
|  |  | 4.1 Introduction to resonance circuits & Resonance tuned circuit |
|  |  | 4.2 Series& Parallel resonance |
|  | 16/11/2021 | 4.3 Expression for series resonance, Condition for Resonance, Frequency of Resonance, continued.. |
|  | 18/11/2021 | 4.3 Impedance, Current, Voltage, power, Q Factor and Power Factor of Resonance, Bandwidth in term of Q. |
| 9th | 22/11/2021 | 4.4 Parallel Resonance (RL, RC& RLC)& derive the expression |
|  |  | 4.5 Comparisons of Series & Parallel resonance& applications |
|  |  | 4.5 Comparisons of Series & Parallel resonance& applications |
|  | 23/11/2021 | 4.6 simple problems of above Circuit |
|  | 25/11/2021 | Revision on Chapter -3 & 4 |
|  | 26/11/2021 | **Unit-5:** LAPLACE TRANSFORM AND ITS APPLICATIONS |
|  |  | 5.1 Laplace Transformation, Analysis and derive the equations for circuit parameters of Step response of R-L. Continued... |
| 10th | 29/11/2021 | 5.1 Laplace Transformation, Analysis and derive the equations for circuit parameters of Step response of R-C &R-L-C |
|  | 30/11/2021 | 5.1 Laplace Transformation, Analysis and derive the equations for circuit parameters of |
|  | 02/12/2021 | 5.2 Analysis and derive the equations for circuit parameters of Impulse response of R-L, R-C, R-L-C |
|  | 03/12/2021 | **Internal assessment** |

| Week | Date | Topic |
|---|---|---|
| 11th | 06/12/2021 | **Unit-6: Two Port Network Analysis** |
| | | 6.1 Network elements, ports in Network (One port, two port), |
| | | 6.2 Network Configurations (T & pie). |
| | 07/12/2021 | 6.3 Open circuit (Z-Parameter)& Short Circuit(Y-Parameter) |
| | | Parameters, continued.. |
| | 09/12/2021 | 6.3 Calculate open & short Circuit Parameters for Simple Circuits |
| 12th | | & its conversion. |
| | 10/12/2021 | 6.4 h- parameter (hybrid parameter) Representation |
| | 13/12/2021 | 6.5 Define T-Network & pie – Network |
| | 14/12/2021 | **Revision on Chapter -5 & 6** |
| | 16/12/2021 | **Class Test -2** |
| | 17/12/2021 | **Unit-7: FILTERS& ATTENUATORS** |
| | | 7.1 Ideal &Practical filters and its applications, cut off frequency, |
| 13th | | pass band and stop band |
| | 20/12/2021 | 7.2 Classify filters- low pass, high pass, & study their |
| | | Characteristics, continued... |
| | 21/12/2021 | 7.2 Classify filters band pass, band stop filters& study their |
| | | Characteristics |
| | 23/12/2021 | 7.3 Butterworth Filter Design |
| | 24/12/2021 | 7.4 Attenuation and Gain, Bel , Decibel &neper and their |
| | | relations |
| 14th | 27/12/2021 | 7.5 Attenuators& its applications. Classification-T- Type |
| | | continued.. |
| | 28/12/2021 | 7.5 PI – Type attenuators |
| | 30/12/2021 | Quiz test on unit-1,2,3 and question discussion |
| | 31/12/2021 | Quiz test on unit-4,5,6&7 and question discussion |
| 15th | 03/01/2022 | **Class Test-3** |
| | 04/01/2022 | Revision and important question on unit-1 & 2 |
| | 06/01/2022 | Revision and important question on unit-3 & 4 |
| | 07/01/2022 | Revision and important question on unit-5,6 &7 |