



GOVERNMENT POLYTECHNIC KORAPUT

Th2. Circuit and Network Theory

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| Name of the Course: Diploma in Electrical Engineering | | | |
| Faculty: Sandhya Kumari Randhi | | | |
| Course code: | Th2 | Semester W.E.F 01/10/2021 | 3rd |
| Total Period: | 75 | Examination | 3hrs |
| Theory periods: | 4P/week | Internal Assessment : | 20 |
| Maximum marks: | 100 | End Semester Examination: | 80 |

DEPARTMENT OF ELECTRICAL

Vision:-

To create competent and industry ready Electrical diploma engineers with professional and social values to meet future challenges.

Mission:-

- To prepare diploma holders through “qualitative competency based education system” to compete with national requirement along with core values
- To produce dynamic Electrical Engineers to serve the society and industry .
- To develop leadership qualities, communication skills, critical thinking and attitude for Lifelong learning.

Program educational objectives:-

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| PEO1: | Apply technical knowledge and skills learned in the field of Electrical Engineering to excel in professional and/or higher education. |
| PEO2: | to provide students an excellent academic environment and make them aware the needs of Society and Industry to become a successful Professional/Entrepreneur. |
| PEO3: | To engage in lifelong learning, career enhancement to adopt emerging technologies |

Course outcomes:-

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| CO1 | Understand the concept and solve problems of magnetic circuit, AC circuit , polyphase circuit AND TWO PORT NETWORK. |
| CO2 | Identify circuit elements and solve complex circuit by using network theorms and techniques like nodal analysis, loop analysis, source transformation and STAR DELTA transformation. |
| CO3 | Study steady state and transient response of electric circuit under DC condition. |
| CO4 | Classify and design filters. |



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TOPIC WISE DISTRIBUTION OF PERIODS

| Sl.No. | Name of the Topic | Period |
|--------|-------------------------------|-----------|
| 1 | Magnetic Circuits | 07 |
| 2 | Coupled Circuits | 05 |
| 3 | Circuit Elements And Analysis | 06 |
| 4 | Network Theorems | 08 |
| 5 | Ac Circuit And Resonance | 08 |
| 6 | Poly-phase Circuit | 06 |
| 7 | Transients | 06 |
| 8 | Two-Port Network | 08 |
| 9 | Filters | 06 |
| | TOTAL | 60 |

LESSON PLAN

| Week | Class Day | Theory/Practical Topics |
|-----------------|-----------|--|
| 1 st | 01 | MAGNETIC CIRCUITS Introduction |
| | 02 | Magnetizing force, Intensity, MMF, flux and their relations |
| | 03 | Permeability, reluctance and permeance |
| | 04 | Analogy between electric and Magnetic Circuits |
| | 05 | Tutorial class |
| 2 nd | 01 | B-H Curve |
| | 02 | Series & parallel magnetic circuit. |
| | 03 | Hysteresis loop |
| | 04 | COUPLED CIRCUITS: Self Inductance and Mutual Inductance |
| | 05 | Tutorial class |
| 3 rd | 01 | Conductively coupled circuit and mutual impedance |
| | 02 | Dot convention, Coefficient of coupling |
| | 03 | Series and parallel connection of coupled inductors. |
| | 04 | Solve numerical problems |
| | 05 | Tutorial class |
| 4 th | 01 | CIRCUIT ELEMENTS AND ANALYSIS: Active, Passive, Unilateral & bilateral, Linear & Non linear elements |
| | 02 | Mesh Analysis, Mesh Equations by inspection, Super mesh Analysis |
| | 03 | Nodal Analysis, Nodal Equations by inspection |
| | 04 | Super node Analysis |
| | 05 | Tutorial class |
| 5 th | 01 | Source Transformation Technique |
| | 02 | Solve numerical problems (With Independent Sources Only) |



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| | 03 | NETWORK THEOREMS: Star to delta and delta to star transformation |
| | 04 | Super position Theorem |
| | 05 | Super position Theorem |
| 6 th | 01 | Thevenin's Theorem |
| | 02 | Norton's Theorem |
| | 03 | Maximum power Transfer Theorem. |
| | 04 | Solve numerical problems (With Independent Sources Only) |
| | 05 | Tutorial class |
| 7 th | 01 | AC CIRCUIT AND RESONANCE: 5.1 A.C. through R-L, R-C & R-L-C Circuit |
| | 02 | Solution of problems of A.C. through R-L, R-C & R-L-C series Circuit by complex algebra method. |
| | 03 | Solution of problems of A.C. through R-L, R-C & R-L-C parallel & Composite Circuits |
| | 04 | Power factor & power triangle. |
| | 05 | Tutorial class |
| 8 th | 01 | Deduce expression for active, reactive, apparent power. |
| | 02 | Derive the resonant frequency of series resonance and parallel resonance circuit |
| | 03 | Define Bandwidth, Selectivity & Q-factor in series circuit |
| | 04 | Solve numerical problems |
| | 05 | Tutorial class |
| 9 th | 01 | POLYPHASE CIRCUIT Concept of poly-phase system and phase sequence |
| | 02 | Relation between phase and line quantities in star & delta connection |
| | 03 | Power equation in 3-phase balanced circuit. |
| | 04 | Solve numerical problems |
| | 05 | Tutorial class |
| 10 th | 01 | Measurement of 3-phase power by two wattmeter method. |
| | 02 | Solve numerical problems. |
| | 03 | TRANSIENTS: Steady state & transient state response. |
| | 04 | Response to R-L circuit under DC condition |
| | 05 | Tutorial class |
| 11 th | 01 | Response to R-C circuit under DC condition |
| | 02 | Response to RLC circuit under DC condition. |
| | 03 | Solve numerical problems |
| | 04 | Solve numerical problems |
| | 05 | Tutorial class |
| 12 th | 01 | TWO-PORT NETWORK Open circuit impedance (z) parameters |
| | 02 | Short circuit admittance (y) parameters |
| | 03 | Transmission (ABCD) parameters |
| | 04 | Hybrid (h) parameters |
| | 05 | Tutorial class |
| 13 th | 01 | Inter relationships of different parameters. |
| | 02 | T and π representation. |
| | 03 | Solve numerical problems |
| | 04 | Solve numerical problems |
| | 05 | Tutorial class |
| 14 th | 01 | FILTERS: Define filter |
| | 02 | Classification of pass Band, stop Band and cut-off frequency |
| | 03 | Classification of filters |



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| | 04 | Constant – K low pass filter. |
| | 05 | Tutorial class |
| 15 th | 01 | Constant – K high pass filter. |
| | 02 | Constant – K Band pass filter. |
| | 03 | Constant – K Band elimination filter. |
| | 04 | Solve Numerical problems |
| | 05 | Tutorial class |

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01/10/2021
Signature of faculty concerned

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01/10/2021
H.O.D. Electrical