



# GOVERNMENT POLYTECHNIC KORAPUT

## Th2. Circuit and Network Theory

Name of the Course: Diploma in Electrical Engineering			
Faculty: Sandhya Kumari Randhi		Semester start - 14/09/2022	
Course code:	Th2	Semester	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:-

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:-

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
	<b>TOTAL</b>	<b>60</b>

### LESSON PLAN

Week	Class Day	Theory/Practical Topics
1 <sup>st</sup>	01	<b>MAGNETIC CIRCUITS</b> 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 <sup>nd</sup>	01	B-H Curve
	02	Series & parallel magnetic circuit.
	03	Hysteresis loop
	04	<b>COUPLED CIRCUITS:</b> Self Inductance and Mutual Inductance
	05	Tutorial class
3 <sup>rd</sup>	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 <sup>th</sup>	01	<b>CIRCUIT ELEMENTS AND ANALYSIS:</b> Active, Passive, Unilateral & bilateral, Linear & Non linear elements



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	02	Mesh Analysis, Mesh Equations by inspection ,Super mesh Analysis
	03	<b>Nodal Analysis</b> , Nodal Equations by inspection
	04	Super node Analysis
5 <sup>th</sup>	05	Tutorial class
	01	Source Transformation Technique
	02	Solve numerical problems (With Independent Sources Only)
	03	<b>NETWORK THEOREMS:</b> Star to delta and delta to star transformation
	04	<b>Super position Theorem</b>
6 <sup>th</sup>	05	Super position Theorem
	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 <sup>th</sup>	01	<b>AC CIRCUIT AND RESONANCE:</b> 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	<b>Power factor &amp; power triangle.</b>
	05	Tutorial class
8 <sup>th</sup>	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 <sup>th</sup>	01	<b>POLYPHASE CIRCUIT</b> 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 <sup>th</sup>	01	Measurement of 3-phase power by two wattmeter method.
	02	Solve numerical problems.
	03	<b>TRANSIENTS:</b> Steady state & transient state response.
	04	Response to R-L circuit under DC condition
	05	Tutorial class
11 <sup>th</sup>	01	Response to R-C circuit under DC condition
	02	<b>Response to RLC circuit under DC condition.</b>
	03	Solve numerical problems
	04	Solve numerical problems
	05	Tutorial class
12 <sup>th</sup>	01	<b>TWO-PORT NETWORK</b> Open circuit impedance (z) parameters
	02	Short circuit admittance (y) parameters
	03	Transmission (ABCD) parameters
	04	Hybrid (h) parameters
	05	Tutorial class



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13 <sup>th</sup>	01	Inter relationships of different parameters.
	02	T and $\pi$ representation.
	03	Solve numerical problems
	04	Solve numerical problems
	05	Tutorial class
14 <sup>th</sup>	01	<b>FILTERS:</b> Define filter
	02	Classification of pass Band, stop Band and cut-off frequency
	03	Classification of filters
	04	Constant - K low pass filter.
	05	Tutorial class
15 <sup>th</sup>	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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14/09/22

Signature of faculty concerned

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14/09/22

H.O.D. Electrical