

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT**Course Curriculum**

AGRICULTURE FOR ENGINEERS
COURSE TITLE:- ELECTRICAL CIRCUITS
(Code:3336306)

Diploma Programme in which this course is offered	Semester in which offered
Agricultural Engineering	3 rd

1. RATIONALE.

In agriculture engineering ,the touch of electrical engineering and it's subjects are very much necessary to understand the importance of fundamentals.This subject has been designed by keeping in mind the usage of applications of various laws and purifications of supply that are going to be learned.

2. COMPETENCY.

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

- i. Learning various network theorems and applications.**
- ii. For having basic knowledge of filtering of supply and its uses along with electrical applications like laplace equations.**

3. TEACHING AND EXAMINATION SCHEME.

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	PA	ESE	PA	150
02	00	02	04	70	30	30	20	

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical;
 C – Credit,ESE -End Semester Examination; PA - Progressive Assessment

4. COURSE DETAILS.

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
Unit – I BASICS OF ELECTRICAL CIRCUITS	1.1 Independent and dependent sources. 1.2 Concept of loop and loop current equations. 1.3 Concept of mesh and nodal analysis. 1.4 Laplace transform in DC circuits.	1.1 Concepts of open circuit, short circuit and closed circuit. 1.2 Definition of independent and dependent sources. 1.3 Definitions of node, branch, loop, mesh. loop equations. 1.4 Mesh Analysis and Nodal Analysis. 1.5 Laplace transform method of finding step response of DC circuits.
Unit– II NETWORK THEOREMS	2.1 Linear and nonlinear circuits, active and passive network. 2.2 Superposition theorem, Thevenin's theorem, Norton's Theorem, Maximum Power transfer theorem, Reciprocity theorem. 2.3 Star-Delta transformation with numerical	2.1 Classify types of electrical circuits. 2.2 Use Superposition Theorem to calculate the current in any branch of the circuit. 2.3 Use Thevenin's Theorem to calculate V_{th} , R_{th} and load current in the given circuit. 2.4 Calculate the load current in the given circuit using Norton's Theorem. 2.5 Determine the maximum current in the load of the circuit using the Maximum Power Transfer Theorem 2.6 State Reciprocity Theorem 2.7 Convert star to delta and delta to star transformations.
Unit–III A.C FUNDAMENTALS	3.1 Instantaneous and average power. 3.2 Resonance in AC circuits. 3.3 Sinusoidal and linear waveforms. 3.4 Polyphase circuits.	3.1 Definitions of instantaneous, average power, power factor. 3.2 Concept of Power triangle, active power, reactive power, apparent power. 3.3 Series and Parallel Resonance in AC circuits. 3.4 Average and effective value of sinusoidal and linear waveforms. 3.5 Sinusoidal steady state response of circuits.

Unit	Outcomes (in cognitive domain)	Major Learning Topics and Sub-topics
Unit-IV Filters in AC circuits	4.1 Filters and it's types. 4.2 Constants in filters. <ul style="list-style-type: none"> • Constant M • Constant K 4.3 Composite filters.	4.1 Introduction and importance of filters. 4.2 Classification of filters. 4.3 Concept of constant K and constant M 4.4 Termination of half network and composite filters.

5. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Basics of Electrical Circuits	9	5	4	5	14
2	Network theorems	12	8	7	10	25
3	A.C fundamentals	10	5	4	7	16
4	Filters in AC circuits	11	5	4	6	15
TOTAL		42	23	19	28	70

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy).

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

General Notes:

1. If midsem test is part of continuous evaluation, unit numbers I and II are to be considered.
2. Ask the questions from each topic as per marks weightage. Numerical questions are to be asked only if it is specified. Optional questions must be asked from the same topic.
3. In examination, example of same chapter is to be asked in place of example.

6. SUGGESTED LIST OF EXERCISES/PRACTICALS.

The exercises/practical/experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency. Following is the list of exercises/practical/experiments for guidance.

Sr. No.	Unit No.	Practical Exercises (outcomes in Psychomotor Domain)	Teaching Hours
---------	----------	---	----------------

1	1	To familiarize with the components and equipments used in Laboratory	02
2	2	To verify Kirchhoff's current laws.	02
3	3	To verify Kirchhoff's voltage laws	02
4	4	To verify Thevenin theorems and Norton's theorems.	04
5	5	To verify Superposition theorem and reciprocity theorem	04
6	6	To Study the sinusoidal response of RL series circuit.	02
7	7	To study the sinusoidal response of RC series circuit.	02
8	8	To study the step response of RL series circuit	02
9	9	To study the step response of RC series circuit	02
10	10	To study the response of constant K-filters	02
11	11	To study the response of m-derived filters	02
12	12	To study power consumed in a three phase circuit	02
Total			28

8 SUGGESTED LEARNING RESOURCES

A. List of Books

Sr No.	Title Of Book	Author	Publication
1	A text book of Electrical Engineering	B.L Theraja, A.k Theraja	Chand Publisher
2	A course in Electrical Technology	J.B Gupta	Kataria and Sons
3	Electrical Technology	Edward Hughes	-

B. List of Major Equipment/ Instrument

1.

C. List of Software/Learning Websites