

Electric Circuits Course Definition File

1. Basic Information:

Course Name	Electric Circuit
Course ID	CEE101
Contact Hours (Registered Sessions)	30
Contact Hours (Synchronized Sessions)	18
Mid Term Exam	
Exam	1.5
Registered Sessions Work Load	30
Synchronized Session Work Load	18
Credit Hours	5

2. Pre-Requisites:

Course	ID
Physics	GPH101
Mathematics Algebra	GMA101

3. Course General Objectives:

This course aims to enable the student to understand the definition of the charge, current, and the relationship between them. The student will acquire knowledge of voltage, power and energy relationships, and he will be able to use them in electric circuits. It aims to enable the student to be able to combine resistors in series and in parallel, and utilize principles of voltage division and current division, and to understand the concepts of nodal and mesh analysis using Kirchhoff's current and voltage laws. It also aims to enable him to utilize the theorems used for simplifying analysis, such as superposition, Thevenin's Theorem and Norton's Theorem. The student will be able to combine capacitors and inductors in series and in parallel.

Phasor representation of circuit elements and transformers will be also comprehended.

This course forms a prerequisite to electronic circuit course at next levels.

4. Intended Learning Outcomes (ILO):

Code	Intended Learning Outcomes
ILO1	Comprehension of the main concepts and laws in electrical circuits, such as charge, current, voltage, power, and energy and their relationships.
ILO2	Understanding the Ohm and Kirchhoff's current and voltage laws and principles of voltage division and current division.
ILO3	Understanding nodes and meshes analysis methods.
ILO4	Understanding some of the major theorems of electrical circuits such as superposition, Thevenin's Theorem and Norton's Theorem.
ILO5	Understanding of the concept of capacitors, and inductors and combining each of them in series and in parallel.
ILO6	Understanding the sinusoid signal, Phasor representation of circuit elements, inductance, admittance, and ac circuit using Kirchhoff's current and voltage laws.
ILO7	Understanding of transformers operation principle and their laws.

5. Course Syllabus (18 hours of total synchronized sessions)

- RS: Recorded Sessions; SS: Synchronized Sessions;

ILO	Course Syllabus	RS	SS	Type	Additional Notes
ILO1	<p>Introductory concepts:</p> <ul style="list-style-type: none"> • Systems of Units • Charge and Current • Voltage • Power and Energy • Circuit Elements 	6	3	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	An example of a typical coverage is found in "Fundamentals of Electric Circuits": chapter 1 (see

					references list below)
ILO1 ILO2	<p>Main Laws:</p> <ul style="list-style-type: none"> ● Ohm’s Laws ● Nodes, Branches, and Loops ● Kirchhoff’s Laws ● Series Resistors and Voltage Division ● Parallel Resistors and Current Division 	6	3	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	An example of a typical coverage is found in “Fundamentals of Electric Circuits”: chapter 2 (see references list below)
ILO1 ILO2 ILO3	<p>Analysis Methods:</p> <ul style="list-style-type: none"> ● Nodal Analysis ● Mesh Analysis ● Comparison 	3	1.5	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	An example of a typical coverage is found in “Fundamentals of Electric Circuits”: chapter 3 (see references list below)
ILO1 ILO2 ILO3 ILO4	<p>Main Theorems:</p> <ul style="list-style-type: none"> ● Superposition ● Thevenin’s Theorem ● Norton’s Theorem ● Maximum Power Transfer 	6	3	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	An example of a typical coverage is found in “Fundamentals of Electric Circuits”: chapter 4 (see references list below)
ILO1 ILO5	<p>Capacitors and Inductors:</p> <ul style="list-style-type: none"> ● Capacitors ● Series and Parallel Capacitors ● Inductors ● Series and Parallel Inductors 	6	3	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices	An example of a typical coverage is found in “Fundamentals of Electric Circuits”:

				<input type="checkbox"/> Others	chapter 6 (see references list below)
ILO1 ILO2 ILO6	<p>AC Circuits:</p> <ul style="list-style-type: none"> • Sinusoids • Phasors • Impedance and Admittance • Kirchhoff's Laws in the Frequency Domain 	6	3	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	An example of a typical coverage is found in "Fundamentals of Electric Circuits": chapter 9 (see references list below)
ILO1 ILO7	<p>Transformers:</p> <p>Transformer Definition</p> <p>Linear Transformers</p> <p>Ideal Transformers</p>	3	1.5	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Assignments <input type="checkbox"/> Seminars <input type="checkbox"/> Projects <input type="checkbox"/> Practices <input type="checkbox"/> Others	An example of a typical coverage is found in "Fundamentals of Electric Circuits": chapter 13 (see references list below)

6. Assessment Criteria (Related to ILOs)

ISC	Interactive Synchronized Collaboration	Ex	Exams	Rpt	Reports
PF2F	Presentations and Face-to-Face Assessments	PW	Practice Work		

ILO Code	ILO	Intended Results	Assessment Type				
			ISC	PW	Ex	PF2F	Rpt
ILO1	Identify the key concepts in electrical circuits such as charge, current, voltage, power and energy		X	X	X		
ILO2	Understanding the principals laws and rules in electric circuit and the ability to use them		X	X	X		
ILO3	Understanding and applying electric circuit analysis methods		X	X	X		
ILO4	Understanding the basic theorems witch facilitate circuit analysis		X	X	X		
ILO5	Understanding capacitors and inductors and combination of each one in series and in parallel		X	X	X		
ILO6	Identifying sinusoidal signal features and p hasor concept, in addition to admittances and impedances relationships, and finally the ability to analyze AC circuits using Kirchoff's Laws		X	X	X		
ILO7	Understanding transformers concept and relationships		X		X		

7. Practice Tools:

Tool Name	Description

8. Main References

1. "Fundamentals of Electric Circuits" by Alexander and Sadiku, 4th edition 2007 or above, The McGraw-Hill Companies, Inc.

9. Additional References

1. "Introduction to Electric Circuits" by R. Drof, 7th edition 2006 or above, John Wiley