

ENELE 101A Principle of Electrical Engineering

PART (1)

CLASS LESSON NOTES FOR BASIC CONCEPTS AT FOUNDATION/ADVANCED DIPLOMA LEVEL

In this subject you will learn about basic principles of electrical engineering. You will develop a range of foundation knowledge and skills relating to:

- Notation and units
- Circuit topologies

Direct current (DC) circuit principles:

- Voltage, current, power, resistance, conductance
- Ohm's Law; Kirchhoff voltage and current laws
- Series and parallel configurations
- Linearity and Superposition
- Thévenin and Norton equivalent circuits (simple cases)
- Nodal and mesh analysis (simple cases)
- Maximum power transfer
- Capacitors
- Passive and switched resistor-capacitor (RC) circuits
- Inductors
- Passive and switched resistor-inductor (RL) circuits
- Diodes

Alternating current (AC) circuit principles:

- Amplitude, frequency and phase
- Voltage
- Current and power in resistors, inductors & capacitors
- Time domain analysis of ac circuits
- Review of complex numbers
- Phasors and phasor notation
- Complex impedance and admittance
- Thévenin and Norton equivalents (simple cases)
- AC power (real, reactive, complex)
- Root-mean-square (RMS) values
- Maximum power transfer.

Week 1 Lesson

Week 2 Lesson

Week 3 Lesson

Week 3A Lesson

Study Guide EE07 & EE011

What to study		Which exercises to do		What practical to do	Resources		
Main study		Additional study	Main exercise		Additional exercises for EE011		
EE07 Unit	EE011 Unit		Study Option (1) EE-07	Study Option (2) EE-07			
UEENEEE004B Solve problems in multiple path d.c. circuits	UEENEEE104A Solve problems in d.c. circuits	See 5 below	See 6 below	See 7 below	See 8 below	See 9 below	See 10 below
Study Option 1	Study Option 1	EE011 = EE07 + Additional					
See 1 below	See 3 below						
Study Option 2	Study Option 2						
See 2 below	See 4 below						

1	http://www.filefactory.com/file/c0b67b7/n/Electrical_Workshop_Wiring_E001_2_3_4_5_7_8_33_G003_4_7.zip
2	
3	http://www.filefactory.com/file/c0b67b7/n/Electrical_Workshop_Wiring_E001_2_3_4_5_7_8_33_G003_4_7.zip
4	
5	Video- http://www.filefactory.com/file/cf8739b/n/E003+E004.zip

6	(2) Click HERE to download other Exercises
7	EE07 & EE011 units mapping for Theory study & Exercises
8	http://www.filefactory.com/file/3qun68epu0lp/n/Advanced_Diploma_in_Electrical_Engineering_Exercises_EE01_1_pdf
9	EE07 & EE011 units mapping for Theory study & Exercises Stage_1_Electrical_workshop_practicals.pdf Wiring_Equipments_to_purchase IN THE LINK INDICATED IN ROLL 11
10	DC_Circuit_E003_E004.zip IN THE LINK INDICATED IN ROLL 11
11	BACK UP FOR 9 & 10 Stage 1 Part 1.zip http://www.filefactory.com/file/c0cb8ab/n/Stage_1_Part_1.zip

Advanced Circuit Analysis (3 pt)

Subjects	Points	Competency Units
Advanced Circuit Analysis		Electrical Circuits Engineering Circuit Analysis Electrical Measurement

Part 1 Over all Knowledge of the subject

[Advanced Circuit Analysis](#)

Part 2 Competency units of the subject

[Advanced Circuits+Electromagnetics+Electronics](#)

[Electrical Circuits 1](#)

[Engineering Circuit Analysis](#)

[Electrical Measurement](#)

Folder	EE301 Electrical Circuit 1 (1 pt)			
File	EE301 Concepts in Electrical Circuit			
	<u>Instruction</u> Study the notes, calculate the example problems then do the exercises numbers as indicated			
Chapter	Page			Topics
				Note- PDF File page number and the page number of the scanned document may be different. The student need to check both as necessary
	27	to	52	Circuit theorem
	54	to	71	Sinusoids & phasors
	73	to	81	Frequency response
Exercise	Q330 to Q337 of Assignment Number (22)			

Folder		EE303 Engineering Circuit Analysis (1 pt)	
File		EE303 Engineering Circuit Analysis	
		Instruction Study the notes, calculate the example problems then do the exercises numbers as indicated	
Chapter	Page	Topics	
		Note- PDF File page number and the page number of the scanned document may be different. The student need to check both as necessary	
2/ 3			Basic circuits Examples 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12
4			Basic Nodal and Mesh analysis Example 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12
5			Linear and Superposition/ Source Transformation Example 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11
8			RL/ RC Circuits Example 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11
9			RLC Circuits Example 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9
10			Sinusoidal steady state analysis Example 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8
11			AC Power Circuit Analysis Example 11.1, 11.2, 11.3, 11.4, 11.5
12			Polyphase Circuits Example 12.1, 12.2, 12.3, 12.4, 12.5, 12.6
13			Magnetically coupled circuits Example 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8
14			Complex Frequency / Laplace Transform Example 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.11
			Laplace Transform Table 14.1, 14.2
15			Circuit analysis in " S " domain Example 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7 Pole/ Zero constellation Example 15.12, 15.13
16			Frequency Response Example 16.1, 16.2
17			Two ports network Example 17.1, 17.2, 17.3, 17.4, 17.5
18			Fourier Circuit Analysis Example 18.1 Use of symmetry theory Table 18.1 Example 18.2, 18.3
Exercise		Q328 to Q367 of Assignment Number (23)	

Folder		EE404 Electrical Measurement (1 pt)	
File		EE404 Electrical Measurement	
		Instruction Study the notes, calculate the example problems then do the exercises numbers as indicated	
Chapter	Page	Topics	
		Note- PDF File page number and the page number of the scanned document may be different. The student need to check both as necessary	
6	197		Measurement of inductance and capacitance
7	270		Measurement of resistance
9	352		Magnetic measurement
11	437		High voltage measurement and tesating
12	480		Location of cable fault
20	730		Measurement of power
21	771		Measurement of energy
Exercise Q368 to Q371 of Assignment Number (24)			

PART (2)

REFERENCE TEXT BOOKS & WEEKLY –LESSONS AT ASSOCIATE DEGREE LEVEL (SELF STUDY)

TEXT BOOK- Textbooks can be copied from USBs & DVD.

Prescribed Text:

Dorf, R & Svoboda, J 2010, *Introduction to Electric Circuits*, 8th or latest edition, John Wiley & Sons, Hoboken, NJ.

WEEK NO:	TOPICS AND ACTIVITIES
Orientation Week	Orientation activities Review of syllabus and assessment activities.
Week 1	Introduction to DC Circuits Reading List: Chapter 1 Sections: 1.1 – 1.5 Chapter 2 Sections: 2.1 – 2.6 & 2.9 Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i> , 8 th Edn, John Wiley & Sons, Hoboken, NJ.
Week 2	Kirchhoff Voltage & Current Laws Reading List: Chapter 3 Sections: 3.1 – 3.6 & 3.10 Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i> , 8 th Edn, John Wiley & Sons, Hoboken, NJ.
Week 3	Node & Mesh Analysis Reading List: Chapter 4 Sections: 4.1 – 4.3, 4.5, 4.6, 4.8, 4.13 Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i> , 8 th Edn, John Wiley & Sons, Hoboken, NJ.
Week 4	Superposition Principle & Source Transformation Thévenin & Norton Equivalent DC Circuits Reading List: Chapter 5 Sections: 5.1 – 5.6 & 5.11 Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i> , 8 th Edn, John Wiley & Sons, Hoboken, NJ.
Week 5	Capacitors & Inductors Reading List: Chapter 7 Sections: 7.1 – 7.8 & 7.13 Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i> , 8 th Edn, John Wiley & Sons, Hoboken, NJ.
Week 6	Passive & Switched RL & RC Circuits Reading List: Chapter 8 Sections: 8.1 – 8.4, 8.6 & 8.12 Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i> , 8 th Edn, John Wiley & Sons, Hoboken, NJ.
Week 7	Examination Week A: Assessment 1: Written examination - 25%

WEEK NO:	TOPICS AND ACTIVITIES
Week 8	<p>Diodes in DC Circuits</p> <p>Introduction to AC Circuits</p> <p>Reading List: Chapter 10 Sections: 10.1 & 10.2</p> <p>Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i>, 8th Edn, John Wiley & Sons, Hoboken, NJ.</p>
Week 9	<p>AC Steady-State Analysis</p> <p>Reading List: Chapter 10 Sections: 10.3 & 10.4</p> <p>Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i>, 8th Edn, John Wiley & Sons, Hoboken, NJ.</p>
Week 10	<p>Complex Numbers & Phasor Notation</p> <p>Reading List: Chapter 10 Sections: 10.5 – 10.6 & 10.11</p> <p>Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i>, 8th Edn, John Wiley & Sons, Hoboken, NJ.</p>
Week 11	<p>Impedance & Admittance</p> <p>Thevenin & Norton Equivalent AC Circuits</p> <p>Reading List: Chapter 10 Section: 10.7 & 10.10</p> <p>Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i>, 8th Edn, John Wiley & Sons, Hoboken, NJ.</p> <p>Assessment 2 Due: Portfolio and/or written report on practicum work and experiments (Laboratory Workbook) – 25%</p>
Week 12	<p>AC Power</p> <p>Reading List: Chapter 11 Sections: 11.1 – 11.6</p> <p>Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i>, 8th Edn, John Wiley & Sons, Hoboken, NJ.</p>
Week 13	<p>Power Superposition & Maximum Power</p> <p>Reading List: Chapter 11 Sections: 11.7 – 11.8</p> <p>Text: Dorf, R & Svoboda, J, 2010, <i>Introduction to Electric Circuits</i>, 8th Edn, John Wiley & Sons, Hoboken, NJ.</p>
Week 14	Study Week
Week 15	<p>Examination Week B:</p> <p>Assessment 3: Written examination – 50%</p>