

BENT110 Electronic Circuit Theory

ECTS Value: 5 ECTS
Self-Study Hours: 64

Contact Hours: 25
Assessment Hours: 36

Overall Objectives and Outcomes

This module is concerned with the important components of the Theory underpinning the bases of electronic circuits. The module will start by looking at the principles underpinning circuit theory including the basic equations and units. The students will be exposed to basic calculations required to calculate the required values both for AC and DC circuits. The module will then continue by looking at the various circuit configurations including parallel, series and combinations thereof. The participant will also learn the bases of three phase circuits and circuit analysis using phasor diagrams.

By the end of this module, the learner will be able to:

Competences

- a. apply the various principals of electrical theory including concepts of Resistance, capacitance, inductance, voltage, current and power;
- b. evaluate the salient differences between AC and DC voltage and be able to derive important values such as the RMS voltage;
- c. represent voltage and current flow in various circuit configurations through the use of phasor diagrams;
- d. set up circuits using the main circuit configurations such as series, parallel and combinations of both;
- e. conduct circuit analysis by correctly using network theorems such as Kirchhoff's laws and other techniques such as Mesh analysis and Nodal analysis;
- f. calculate the current flowing through the branches of a circuit by the application of network theorems such as Thevenin's Theorem including practical power utilities and communication applications for maximum power transfer;
- g. derive fundamental concepts and equations of three phase circuits in electrical power engineering.

Knowledge

- a. define the concept of resistance, capacitance and inductance;
- b. outline how to set up circuits in different combinations of series and parallel configurations;
- c. know how to calculate parameters such as reactance, current, voltage, power, power factor;
- d. outline the various network theorems available;
- e. identify the procedure used for network analysis using various theorems and methods;
- f. know the relationships between phasor diagrams and complex notation;
- g. understand admittance in ac circuits and networks.

Skills

- a. design various simple circuits to achieve particular functionality;
- b. show how network theorems can be used to determine currents and voltages in various circuit configurations.

Assessment Methods

This module will be assessed through: Research Assignment (50%), Presentation (20%), Practical assignment (30%)

Suggested Readings

Core Reading List:

1. Hughes Edward, (2008). Hughes Electrical and Electronic Technology, Tenth Edition. Pearson PH.
2. Tooley Mike, (2006). Electronic Circuits: Fundamentals and Applications, Third Edition. Routledge.

Supplementary Reading List:

1. Franco Sergio, (1994). Electric Circuit Fundamentals. Oxford University Press.
2. Bird, J. (2017). Electrical Circuit Theory and Technology. Routledge.
3. Boylestad R.L. and Nashelsky, L. (2013). Electronic Devices and Circuit Theory: Pearson New International Edition. Pearson.