2.2.2 Circuit Analysis 2

Circuit Analysis 2

Module Summary
Module code: EEIB220
Module coordinator: Prof. Dr. Alfons Klönne
Credits (ECTS): 4 Points
Semester: 2. Semester
Pre-requisites with regard to content: Competencies acquired in lectures Mathematics 1 and Circuit Analysis 1
Pre-requisites according to the examination regulations: Regarding to the examination regulations no pre-requisites are required
Competencies: Participants will be able to describe and analyze Alternating Current (AC) circuits. After having successfully completed the course, they should • be able to describe periodic AC signals • can determine arithmetic mean and root mean square values of AC signals • understand how to transfer time invariant sinusoidal functions into complex vectors • be able to describe AC Circuits under steady state condition • know how to analyze AC circuits by complex RLC circuit analysis • be endued with the transfer function of AC circuits • understand and apply Bode diagrams • know the criteria of resonant circuits • understand the principle of Three-Phase circuits • be able to calculate the power in AC circuits and Three-Phase circuits in order to develop an deepened understanding of electric systems that are widely used in communication and power system engineering.
Assessment: The electrical energy supply is based upon alternating current technology. Therefore, this module provides the theoretical background and helps to understand its implementation. Additionally, many disciplines in electrical engineering, e.g. communication technology with radio signal transfer depend on AC signal understanding.

Course: Circuit Analysis 2 (AC)
Module code: EEIB221
Lecturer: Prof. Dr. Alfons Klönne, NN
Scope of weekly semester hours (SWS): 4
Semester of delivery: Summer semester

Type/mode: Lecture, Compulsory subject
Language of instruction: English
Content: • Sinusoidal inputs and their representations • Instantaneous, Average, and RMS Values • Impedance and Series RLC Circuits • Admittance and Parallel RLC Circuits • Transfer Function of RLC Circuits • Bode diagram • Power in AC circuits • Resonance • Three-Phase circuits
Recommended reading: • Presentations and Media on Ilias learning platform • Jacob, Michael: Advanced AC Circuits and Electronics: Principles and Applications, Herrick & Jacob Series, 2003 • Rawlins, Clay: Basic AC Circuits, Newnes, 2000

Course: Circuit Analysis 2 (AC) Lab
Module code: EEIB222
Lecturer: Sebastian Coenen
Scope of weekly semester hours (SWS): 2
Semester of delivery: Summer semester
Type/mode: Labor, Compulsory subject
Language of instruction: English
Laboratory tests to: • Characteristics of passive and active two-terminal networks • Characterization of the properties of a circuit for voltage stabilization with Zener diode • Measurement of an unknown mixed voltage • Measurement of the speed of sound with ultrasound • Construction and measurements of basic OP circuits to record their characteristic values • Measurement of complex alternating current values on RC and RLC elements • DC voltage stabilization • Basic circuits with operational amplifiers • Working with the analog oscilloscope • Frequency response of RC networks
Recommended reading: • Presentations and Media on Ilias learning platform • Jacob, Michael: Advanced AC Circuits and Electronics: Principles and Applications, Herrick & Jacob Series, 2003

- Rawlins, Clay: Basic AC Circuits, Newnes, 2000