

Name: Basic Circuit Theory

Prerequisites: Physics, Mathematics

Course contents:

DC linear circuits: electrical components, energy, Kirchhoff laws, methods for solving linear circuits, steady state electrical circuits, circuits with one generator, superposition principle, applications of Tellegen theorem and of Thévenin and Norton theorems, Millmann theorem.

AC linear circuits: phasors and symbolic method, impedance, instantaneous, active and reactive powers, conservation of complex power, power factor correction, resonance, balanced and unbalanced three phases systems, power measurements in three phases systems, power factor correction in three phase systems, Aron theorem and applications.

Transformer: magnetic circuits and Hopkinson laws, reluctance, electromagnets, power losses in ferromagnetic materials. Magnetically coupled circuits, ideal transformer, full-load and no-load behaviour, short circuit, efficiency, voltage drop.

Electric machinery: principles of electromechanical energy conversion, basics on asynchronous motors, mechanical and electro-mechanical characteristics, start-up.

Recommended reading: G.Fabricatore, Elettrotecnica e Applicazioni, Liguori
Notes to be downloaded at www.elettrotecnica.unisa.it

Teaching methods: lectures

Assessment methods: written and oral examination