ELEN20005 Foundations of Electrical Networks

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: January, Parkville - Taught on campus. Semester 2, Parkville - Taught on campus. On Campus
Time Commitment:	Contact Hours: 3 one hour lectures and 1 two hour workshop per week Total Time Commitment: 120 hours.
Prerequisites:	Undergraduate Students VCE Physics OR equivalent AND

Subject	Study Period Commencement:	Credit Points:
ENGR10003 Engineering Systems Design 2	Not offered 2011	12.50

AND one of:

Subject	Study Period Commencement:	Credit Points:
MAST10006 Calculus 2	Semester 1, Semester 2	12.50
MAST10008 Accelerated Mathematics 1	Semester 1	12.50

AND one of:

Subject	Study Period Commencement:	Credit Points:
MAST10007 Linear Algebra	Summer Term, Semester 1, Semester 2	12.50
MAST10009 Accelerated Mathematics 2	Semester 2	12.50

Graduate Students

Enrolment in Master of Engineering (Electrical, Mechanical, or Mechatronics)

Corequisites:	None
Recommended Background Knowledge:	Knowledge of the following subject is recommended

Subject	Study Period Commencement:	Credit Points:
PHYC10004 Physics 2: Physical Science & Technology	Semester 2	12.50

Non Allowed Subjects:	431-103 Electrical Circuits 1 431-102 Digital Systems 1 431-101 Foundations of Electrical Circuits
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/

Coordinator:	Dr Brian Krongold
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Subject Overview:	This subject introduces fundamental modelling techniques for the analysis of systems that involve electrical phenomena. Topics include: # Electrical phenomena – charge, current, electrical potential, conservation of energy and charge, the generation, storage, transport and dissipation of electrical power, and the use of electrical phenomena for energy distribution, telecommunications and information processing; # Network models – networks of “flow-drop” one-port elements, Kirchoff’s laws, standard current-voltage models for one-ports (independent sources, resistors, capacitors, inductors, transducers, diodes), analysis of static networks, properties of linear time-invariant (LTI) one-ports and impedance functions, transformers, steady-state (DC and AC) analysis of LTI networks via mesh and node techniques, equivalent circuits, and transient analysis of simple circuits; # Digital systems – electrical encoding of information and the digital abstraction, analog-to-digital and digital-to-analog conversion, quantization and resolution, switching algebra, combinational logic networks, digital-data storage and simple sequential logic networks. This material will be complemented by exposure to software tools for the simulation of electrical and electronic systems and the opportunity to develop basic electrical engineering laboratory skills.
Objectives:	On completing this subject the student should be able to: # Apply physical principles, fundamental abstractions and modelling techniques in the analysis of electrical and electronic systems; # Construct and test simple electrical and electronic networks in the laboratory; # Use software tools to simulate and synthesise simple electrical and electronic circuits.
Assessment:	One written examination, not exceeding three hours at the end of semester, worth 60% (must pass written exam to pass subject); Continuous assessment of project work, not exceeding 30 pages in total over the semester, worth 30%One mid-semester test(not exceeding 90 minutes), worth 10%.One
Prescribed Texts:	None
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2011/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2011/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2011/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2011/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completion of this subject students should have developed the following generic skills: # Ability to apply knowledge of basic science and engineering fundamentals # Ability to undertake problem identification, formulation and solution # Ability to communicate effectively, with the engineering team and with the community at large # Capacity for independent critical thought, rational inquiry and self-directed learning # Expectation of the need to undertake lifelong learning, capacity to do so
Notes:	This subject is available for science credit to students enrolled in the BSc (new degree only).

Related Course(s):	Bachelor of Science
Related Majors/Minors/ Specialisations:	B-ENG Electrical Engineering stream B-ENG Mechanical Engineering stream Master of Engineering (Electrical) Master of Engineering (Mechanical) Master of Engineering (Mechatronics)
Related Breadth Track(s):	Electrical Systems