

ELEN30009 Electrical Network Analysis and Design

Credit Points:	12.50						
Level:	3 (Undergraduate)						
Dates & Locations:	2012, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.						
Time Commitment:	Contact Hours: 3 one hour lectures and 1 two hour workshop per week Total Time Commitment: 120 hours						
Prerequisites:	Prerequisite for this subject is: <table border="1" data-bbox="389 573 1485 719"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>ELEN20005 Foundations of Electrical Networks</td> <td>January, Semester 2</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	ELEN20005 Foundations of Electrical Networks	January, Semester 2	12.50
Subject	Study Period Commencement:	Credit Points:					
ELEN20005 Foundations of Electrical Networks	January, Semester 2	12.50					
Corequisites:	None						
Recommended Background Knowledge:	Knowledge of the following subject is recommended <table border="1" data-bbox="389 887 1485 1032"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>PHYC10004 Physics 2: Physical Science & Technology</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	PHYC10004 Physics 2: Physical Science & Technology	Semester 2	12.50
Subject	Study Period Commencement:	Credit Points:					
PHYC10004 Physics 2: Physical Science & Technology	Semester 2	12.50					
Non Allowed Subjects:	ELEN20002(431-210) Electrical Circuits 2						
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:	Assoc Prof Elaine Wong						
Contact:	Email : ewon@unimelb.edu.au (mailto:ewon@unimelb.edu.au)						
Subject Overview:	<p>This subject develops a fundamental understanding of linear time-invariant network models for the analysis and design of electrical and electronic systems. Topics include:</p> <ul style="list-style-type: none"> # Transient and frequency domain analysis of linear time-invariant (LTI) models – linearity, time-invariance, impulse response and convolution, oscillations and damping, the Laplace transform and transfer functions, frequency response and bode plots, lumped versus distributed parameter transfer functions, poles, zeros, and resonance; # Electrical network models – one-port elements, impedance functions, two-port elements, dependent sources, matrix representations of two-ports, driving point impedances and network functions, ladder and lattice networks, passive versus active networks, multi-stage modelling and design, and multi-port generalisations; # Analysis and design of networks involving ideal and non-ideal operational amplifiers. <p>These topics will be complemented by exposure to software tools for electronic circuit simulation and further development of laboratory skills.</p>						
Objectives:	On completing this subject the student should be able to:						

	<ul style="list-style-type: none"> # Model and analyse the linear time-invariant behaviour of electrical and electronic systems, in both the time and frequency domain; # Design, construct and test passive and active electrical networks that achieve specified linear time-invariant behaviour; # Use software tools to simulate the behaviour of linear electrical networks.
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%; A one hour mid-semester test, worth 10%.
Prescribed Texts:	TBA
Recommended Texts:	Electric Circuits (James W. Nilsson, Susan Riedel)
Breadth Options:	<p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> # Bachelor of Arts (https://handbook.unimelb.edu.au/view/2012/B-ARTS) # Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2012/B-COM) # Bachelor of Environments (https://handbook.unimelb.edu.au/view/2012/B-ENVS) # Bachelor of Music (https://handbook.unimelb.edu.au/view/2012/B-MUS) <p>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.</p>
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	<p>On completion of this subject students should have developed the following generic skills:</p> <ul style="list-style-type: none"> # Ability to apply knowledge of basic science and engineering fundamentals # Ability to undertake problem identification, formulation and solution # Ability to utilise a systems approach to design and operational performance # 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
Related Course(s):	Bachelor of Engineering
Related Majors/Minors/Specialisations:	<p>B-ENG Electrical Engineering stream Electrical Systems Master of Engineering (Electrical) Master of Engineering (Mechatronics) Science-credited subjects - new generation B-SCI and B-ENG. Core selective subjects for B-BMED.</p>
Related Breadth Track(s):	Electrical Engineering