ELEN90074 Introduction to Power Engineering

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2015, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours of lecture (3 x 1 hour lecture per week) and up to 24 hours of workshops Total Time Commitment: 200 hours
Prerequisites:	Prerequisite for students enrolled in the MC-ENG Master of Engineering (Electrical) and (Electrical with Business) is: **Subject** | **Study Period Commencement:** | **Credit Points:** ELEN30011 Electrical Device Modelling | Semester 2 | 12.50 Prerequisites for students enrolled in MC-ENGYSYS Master of Energy Systems are: **Subject** | **Study Period Commencement:** | **Credit Points:** ELEN90069 Electrical Power Systems | Semester 1 | 12.50 **AND** Approval from the subject coordinator
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Prof Michael Cantoni
Contact:	Email: **cantoni@unimelb.edu.au (mailto:cantoni@unimelb.edu.au)**
Subject Overview:	**AIMS** The aim of this subject is to understand the fundamental concepts and basic theory involved in modelling and analysis of the various components that comprise power systems. Power systems involve the generation, conversion, transmission and distribution of electricity via the use of specific devices, such as transformers, generators and motors. It is expected that at the end of this subject the student will have developed a sound understanding of the functionality and characteristics in terms of physical concepts and mathematical models of each of the covered components and relate them to the real life operation of power systems, such as a country’s power grid or smaller power systems that connect to the grid. **INDICATIVE CONTENT**

	The topics covered in this subject include: review of the basic theory of single-phase as well as three-phase circuits; calculations of power (real, reactive and complex); models for transmission and distribution power lines (overhead and cables); models for loads; basic models for DC machines, the synchronous generator and the induction motor; power transfer between buses (nodes), generators to loads; derivation of conditions for maximum power transfer; static stability limits; an introduction to protection and fault analysis.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILOs)** It is expected that on completing this subject the students should be able to: 1 Apply physical principles, fundamental abstractions and modelling techniques in the analysis of power system components and devices 2 Develop and demonstrate basic electrical engineering laboratory skills through simulation of practical real life electrical power systems using software tools and analyse the performance and characteristics of each of its components 3 Compare the performance and reliability of physical power systems obtained through simulation with theoretical analysis.
Assessment:	Continuous assessment of laboratory workshop in small groups (2-3 students) in weeks 2-12, requiring approximately 25- 30 hours of work per student (20%) One 90-minute mid-semester test (20%) One written examination, not exceeding three hours, during the end of semester examination period (60%) Hurdle requirement: Students must pass the end of semester written exam to pass the subject. Intended Learning Outcomes (ILOs) 1 - 3 are assessed in the final written examination, the mid-semester test, and assignments. ILOs 2-3 are assessed as part of the laboratory workshops outcomes and written reports.
Prescribed Texts:	None
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	# Ability to apply basic fundamentals of science and engineering to solve real life problems associated with power systems # Ability for in-depth technical competence in power systems engineering discipline # Ability to identify, formulate, analyse and solve practical engineering problems # Capacity for independent critical thought, rational assessment and self-directed learning # Ability to communicate and work effectively with teams # Ability to write technical reports in a clear and concise manner # Ability to present results of technical investigation to a large audience.
Notes:	**LEARNING AND TEACHING METHODS** This mode of delivery of this subject is through lectures supported by tutorial s and practical hands-on workshops. **INDICATIVE KEY LEARNING RESOURCES** Full set of lecture notes, tutorial sets and model solutions as well as workshops reports are provided. **CAREERS / INDUSTRY LINKS** Guest speakers from power industry are usually invited to give seminars on technical issues related to their respective companies and how these issues relate to the content of this subject.
Related Majors/Minors/ Specialisations:	Master of Engineering (Electrical with Business) Master of Engineering (Electrical)