ELEN90060 Power System Analysis

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2014, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 hours of lectures and 24 hours of workshops Total Time Commitment: 200 hours
Prerequisites:	Prerequisites for this subjects are:

Subject	Study Period Commencement:	Credit Points:
ELEN30009 Electrical Network Analysis and Design	Semester 1	12.50
ELEN30011 Electrical Device Modelling	Semester 2	12.50

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 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/
Contact:	Assoc Prof Mohammad Aldeen Email: **aldeen@unimelb.edu.au (https://mce_host/faces/htdocs/aldeen@unimelb.edu.au)**
Subject Overview:	**AIMS** This subject provides an insight into the basic elements of electrical power transmission and distribution systems such as generators, transmission and distribution lines, and loads. It offers analytical tools for analysis of basic operations of these systems. Problems related to power flow and use of numerical algorithms such Gauss-Siedel, Newton-Raphson will be discussed. Fault calculation and analysis, symmetrical components and protection systems: Analytical methods for solving symmetrical (balanced) faults, protection systems will be covered in details. Finally power system transient and voltage stability as well primary control systems will be analysed. **INDICATIVE CONTENT** Comprehensive analysis of single and three-phase AC power circuits, which includes calculations of real, reactive and complex powers, and power factor correction. Calculation of active and reactive power transfer between buses, maximum power transfer, static stability limit. Power circle construction and analysis. Synchronous generator models, voltage stability, transient stability, primary control devices (Governor and Exciter) Load flow calculations, numerical methods analysis and, Gauss method, Gauss-Seidel method, Newton-Raphson method and simplified approximate method.

	Computer simulation packages, Matlab/Simulink (SimPower) and Power World.
Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** Having completed this unit the student is expected to: 1 Understand the behaviour of the basic components of power systems; 2 Compute power flow in transmission systems; 3 Compute fault quantities, such as voltage, current and power is transmission systems under normal and fault conditions; 4 Ascertain the stability of power systems from operating conditions; 5 Use software tools to simulate and study the steady-state and dynamic behaviour of electrical power systems.
Assessment:	One written three hour examination at the end of semester, worth 60%; One written two hour mid- semester examination worth 20% Continuous assessment of submitted project work completed in small groups (2-3 students), not exceeding 20 pages over the semester, worth 20%; Hurdle requirement: Students must pass the written exam to pass the subject. Intended Learning Outcomes (ILOs) 1, 2, 4 and part of 3 are assessed in the mid-semester and final examination. ILO 5 and part of 3 are assessed as part of the continuous assessment.
Prescribed Texts:	TBA
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. Students also have access to past examination papers and solutions. **CAREERS / INDUSTRY LINKS** Two 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:	B-ENG Electrical Engineering stream Master of Engineering (Electrical with Business) Master of Engineering (Electrical)