ELEN90060 Power System Analysis

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2013.
Time Commitment:	Contact Hours: 36 hours of lectures and 24 hours of workshops Total Time Commitment: 120 hours
Prerequisites:	Prerequisites for this subjects are:

Subject	Study Period Commencement:	Credit Points:
ELEN30009 Electrical Network Analysis and Design	Not offered 2013	12.50
ELEN30011 Electrical Device Modelling	Not offered 2013	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:	This subject provides an insight into the basic elements of electrical power distribution systems such as generators, transmission,distribution, and loads. It offers analytical tools for analysis of basic operations of these systems. Problems related to power flow from source to load, practical constrains and solutions will be discussed in detail. The following topics will be covered. # Single-phase AC circuits, three-phase AC circuits, power calculation in AC circuits; # Transmission Systems: power transmission equations, static capacity limits, stability limit; # Synchronous Generator: construction, equivalent circuits in the d- and q-axis, real and reactive power transfer, loading capability; # Load Flow: problem formulation, single-machine infinite bus, two- and three-bus systems, numerical solutions, Gauss-Siedel, Newton-Raphson methods; # Fault Analysis and Protection Systems: Analytical methods for solving symmetrical (balanced) faults, protection systems; # Symmetrical Components: Phase-sequence transformation, derivation of sequence networks, analysis of line to ground faults, double line faults and double line to ground faults; # Power System Stability: swing equation, power-rotor angle curves, stability conditions, equal area criterion, critical fault clearing angle and critical fault clearing time, protection systems. # Voltage Stability: Angle vs Voltage stability, Reactive power flow and voltage collapse, mathematical formulation of voltage stability problem, voltage stability analysis, preventing of voltage collapse.

Objectives:	On completing this subject the student should be able to # Understand the behaviour of the basic components of power systems, # Compute power flow in transmission systems, # Compute fault quantities, such as voltage, current and power is transmission systems under normal and fault conditions, # Ascertain the stability of power systems from operating conditions, # Use software tools to simulate and study the steady-state and dynamic behaviour of electrical power systems.
Assessment:	One written three hours examination at the end of semester, worth 60%(must pass written exam to pass subject) One mid- semester test worth 15% Continuous assessment of workshops over the semester worth 15%. Projects,Assignments, Reading, and written reports worth 10%.
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.
Related Course(s):	Bachelor of Engineering (Electrical Engineering) Bachelor of Engineering (Electrical) and Bachelor of Arts Bachelor of Engineering (Electrical) and Bachelor of Commerce Bachelor of Engineering (EngineeringManagement) Electrical
Related Majors/Minors/ Specialisations:	B-ENG Electrical Engineering stream Master of Engineering (Electrical)