



The University of Southern Queensland

## Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.  
Please consult the web for updates that may occur during the year.

### Description: Electrical Plant

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ELE	3803	86300	1, 2009	ONC	1.00	Toowoomba

<b>Academic group:</b>	FOENS
<b>Academic org:</b>	FOES04
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	031301

### STAFFING

Examiner: Ron Sharma  
Moderator: Tony Ahfock

### REQUISITES

Pre-requisite: ELE1801 or Students must be enrolled in one of the following Programs: GCEN or GDET or METC or MEPR

### OTHER REQUISITES

Recommended prior or concurrent study: ELE2702 for Bachelor of Engineering Technology and Associate Degree programs.

### SYNOPSIS

Electricity touches almost every aspect of our lives and occupations. In Electrical Plant students develop skills and knowledge in the selection, installation, operation, control and maintenance of electrical equipment such as transformers, power supplies, motors, generators and other types of energy converters found in the workplace. It provides students with skills to carry out performance analysis of electrical equipment, power generation and supply systems and conduct energy audit of electrical installations.

### OBJECTIVES

The course objectives define the student learning outcomes for a course. The assessment item(s) that may be used to assess student achievement of an objective are shown in parenthesis. On completion of this course, students should be able to:

1. analyse unbalanced three phase networks, determine neutral currents or neutral shift voltages in unbalanced systems and draw phasor diagrams of such systems (assignment 1 and exam);
2. use SAA Wiring Rules and explain earthing and safety systems (assignment 1, 2 and exam);

3. analyse the performance of power transformers, ac motors and ac generators using equivalent circuit models (assignment 1 and exam);
4. evaluate and specify details of design, construction, safety, performance, and diagnostic checklist of power transformers, ac motors and ac generators (exam);
5. outline requirements for choosing type of plants for generation and storage of electrical energy (exam);
6. analyse power distribution networks using the per unit system (exam);
7. numerically evaluate fault current levels in simple supply systems (exam); and
8. analyse energy management guidelines and perform energy audit of electrical installations (assignment 2).

## TOPICS

	Description	Weighting (%)
1.	Three Phase System Analysis; earthing and safety	15.00
2.	Transformers	10.00
3.	Induction Machines	10.00
4.	Synchronous Machines	13.00
5.	Generation and Storage of Electrical Energy	20.00
6.	Supply System Analysis	12.00
7.	Batteries and Auxiliary Power Supplies	10.00
8.	Energy Economics and Management	10.00

## TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

*ELE3803 Electrical plant: external study package*, University of Southern Queensland, Toowoomba.

## REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Various Australian Standards and Energy Management Publications.

IEEE/IEE/IEAust Technical Papers - as specified in Study Book.

Guru, BS & Hizirogiu, HR 2000, *Electric machinery and transformers*, 3rd edn, Oxford University Press, Oxford.

McKenzie Smith, I 2005, *Hughes electrical technology*, 9th edn, Pearson Prentice Hall, Harlow, UK.

Pansini, AJ 2002, *Guide to electric power generation*, 3rd edn, Fairmont Press, Lilburn, GA.

Wildi, T 2005, *Electrical machines, drives, and power systems*, 6th edn, John Wiley, New York.  
 Yamayee, ZA & Bala, JL 1994, *Electromechanical energy devices and power systems*, J Wiley, Singapore.

(International Edition)

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	20.00
Directed Study	40.00
Examinations	2.00
Field Trips or Excursions	6.00
Lectures	26.00
Private Study	33.00
Report Writing	15.00
Tutorials	13.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	100.00	10.00	20 Apr 2009
ASSIGNMENT 2	150.00	15.00	18 May 2009
2 HOUR RESTRICTED EXAMINATION	750.00	75.00	END S1 (see note 1)

### NOTES

1. Student Administration will advise students of the dates of their examinations during the semester.

## IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:
  - (i) It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
  - (ii) Student must attend and complete the requirements of the Workplace Health and Safety training program for this course before they are able to undertake any practical work in the electrical laboratories.
- 2 Requirements for students to complete each assessment item satisfactorily:
 

To satisfactorily complete an assessment item a student must achieve at least 50% of the marks or a grade of at least C-. Students do not have to satisfactorily complete each assessment item to be awarded a passing grade in this course. Refer to Statement 4 below for the requirements to receive a passing grade in this course.

- 3 Penalties for late submission of required work:  
If students submit assignments after the due date without extenuating circumstances then a penalty of 5% of the assigned mark may apply for each working day late up to a maximum of ten working days at which time a mark of zero can be recorded for that assignment.
- 4 Requirements for student to be awarded a passing grade in the course:  
To be assured of receiving a passing grade in a course a student must obtain at least 50% of the total weighted marks for the course.
- 5 Method used to combine assessment results to attain final grade:  
The final grades for students will be assigned on the basis of the weighted aggregate of the marks (or grades) obtained for each of the summative assessment items in the course.
- 6 Examination information:  
In a Restricted Examination, candidates are allowed access to specific materials during the examination. The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material which could give the student an unfair advantage in the examination); calculators which cannot hold textual information (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination).
- 7 Examination period when Deferred/Supplementary examinations will be held:  
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.
- 8 University Regulations:  
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

## **ASSESSMENT NOTES**

- 1 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.
- 2 Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.
- 3 In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.
- 4 The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media.
- 5 The Faculty will NOT accept submission of assignments by facsimile.
- 6 Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.
- 7 In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.
- 8 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed

time may be awarded one of the temporary grades: IM (Incomplete - Make up), IS (Incomplete - Supplementary Examination) or ISM (Incomplete -Supplementary Examination and Make up). A temporary grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.

- 9 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).

## **OTHER REQUIREMENTS**

- 1 Students will require access to e-mail and internet access to USQConnect for this course.
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