



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 Measurement and Analysis

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ELE	2702	86552	1, 2009	EXT	1.00	Toowoomba

Academic group:	FOENS
Academic org:	FOES04
Student contribution band:	2
ASCED code:	031301

STAFFING

Examiner: Gordon Hampson
Moderator: Tony Ahfock

REQUISITES

Pre-requisite: (ENG1500 or MAT1500) and ELE1801

SYNOPSIS

In electrical, electronic and instrumentation industries, engineering professionals perform tests and measurements for quality assurance and performance evaluation to comply with Australian Standards. They need to acquire basic knowledge and skills in electrical analogue measurement techniques and to become familiar with Australian Standards. Topics in this course deal with theoretical aspects of using analogue measuring instruments and test equipment, and analytical techniques for performance evaluation of components, devices and circuits.

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. describe common measuring instruments, devices and circuits, and their application to electrical testing (exam);
2. identify and classify error sources, and explain how their effects can be minimised in particular measurement situations (assignment report and exam);
3. analyse single- and three-phase circuits to determine voltage and current values, by means of complexors, matrices and phasor diagrams (CMA 1, CMA 2, assignment report and exam);
4. analyse test measurements and circuit performance mathematically in both time and frequency domains, with the aid of network theorems, response curves and locus diagrams (CMA 1, CMA 2, assignment report and exam);
5. specify details of instrumentation and devices intended for a particular application (exam);

6. evaluate the results of tests and measurements taken from circuitry constructed by the student (assignment report); and
7. demonstrate, through technical report writing, competency in the use of proprietary software for both mathematical and graphical analysis of data (assignment report).

TOPICS

	Description	Weighting (%)
1.	DC Instruments and Bridges	5.00
2.	Complexors and Phasors	3.00
3.	Network Theorems	15.00
4.	AC Waveforms, Harmonics, Filters and Resonance	15.00
5.	AC Instruments	8.00
6.	Power, Power Factor and Energy	10.00
7.	Polyphase Measurements	18.00
8.	Transformers in Measurements	15.00
9.	AC Bridge Measurements and Locus Diagrams	8.00
10.	DC Transients	3.00

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).

USB drive for use as a work drive with Mathcad.

A cheap protractor, scale ruler, dividers and drawing compass.

Components for Mini (Home) Experiments, as specified in the Workbook (normally available from electrical parts and hobby retailers).

Mathcad software, version 14, 13, 12 or 11 (Win) student edition (available directly from Hearne Scientific Software <<http://www.hearne.com.au>>) (Note: it is Mathcad that is specified, NOT Matlab, NOT Mathematica and NOT Microsoft Excel). Telephone Herne, Melbourne and ask to purchase the STANDALONE STUDENT LICENSE at \$215 incl GST (as at June 2006). Phone within Australia: (03) 9602 5088. Phone outside Australia: +61 3 9602 5088.

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.

In this course, the study book serves as the text book and main source of all assessable information - sufficient for students to meet all of the course objectives to a high level of achievement without recourse to the recommended reference materials.

Alexander, CK 2000, *Fundamentals of electric circuits*, McGraw-Hill, Boston.

Boylestad, RL 2000, *Introductory circuit analysis*, 9th edn, Prentice-Hall, New Jersey.

(USQ Library Call No. 621.3192 Boy)

Carlson, AB & Gisser, DG 1990, *Electrical engineering concepts and applications*, 2nd edn, Addison Wesley, Reading, Mass.

Chapman, SJ 2002, *Electric machinery and power systems fundamentals*, McGraw-Hill, Boston.

(USQ Library Call No. 621.31042 Cha)

Cogdell, JR 1997, *Foundations of electrical engineering*, 2nd edn, Prentice Hall, New Jersey.

Dorf, RC & Svoboda, JA 2006, *Introduction to electric circuits*, 7th edn, John Wiley, New York.

Hambley, AR 2005, *Electrical engineering principles and applications*, 3rd edn, Prentice Hall, New Jersey.

Helfrick, AD & Cooper, WD 1990, *Modern electronic instrumentation and measurement techniques*, Prentice Hall, New Jersey.

Larsen, RW 2004, *Introduction to Mathcad 11*, Pearson Education, New Jersey.

(USQ Library Call No. 510.2855369 Lar)

McKenzie Smith, I 1995, *Hughes electrical technology*, 7th edn, Longman Scientific, Harlow, UK.

Morley, A & Hughes, E 1994, *Principles of electricity*, 5th edn, Longman Scientific and Technical, Harlow, UK.

Morris, NM 1994, *Electrical and electronic engineering principles*, Longman Scientific and Technical, Harlow, UK.

Roadstrum, WH & Wolaver, DH 1994, *Electrical engineering for all engineers*, 2nd edn, John Wiley, New York.

Simpson, CD 1992, *Introduction to electric circuits and machines*, Prentice Hall, Scarborough, Ont Canada.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessments	16.00
Directed Study	54.00
Examinations	2.00
Private Study	60.00
Report Writing	23.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
CMA F1	100.00	0.00	23 Apr 2009
CMA S1B	100.00	10.00	23 Apr 2009
ASSIGNMENT	200.00	20.00	29 May 2009
CMA F2	100.00	0.00	05 Jun 2009
CMA S2B	100.00	10.00	05 Jun 2009
2 HOUR CLOSED EXAMINATION	600.00	60.00	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:
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
- 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 prior approval then a penalty of 5% of the total marks gained by the student for the assignment will apply for each working day late.
- 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 Closed Examination, candidates are allowed to bring only writing and drawing instruments into the examination. For the two-hour closed examination in this course, calculators are not permitted. Students are required to supply their own drawing instruments, including a cheap protractor.
- 7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the next examination period.

- 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. However, in this course students may submit web-based CMA tests electronically in the format specified in the assignment requirements.
- 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.
 - 2 Students will require access to computer and printer facilities to complete and print assignment work using Mathcad software.
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