



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	Term	Mode	Units	Campus
ELE	2702	1, 2010	EXT	1	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. On completion of this course, students should be able to:

1. describe common measuring instruments, devices and circuits, and their application to electrical testing;
2. identify and classify error sources, and explain how their effects can be minimised in particular measurement situations;
3. analyse single- and three-phase circuits to determine voltage and current values, by means of complexors, matrices and phasor diagrams;
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;
5. specify details of instrumentation and devices intended for a particular application;
6. evaluate the results of tests and measurements taken from circuitry constructed by the student; and
7. demonstrate, through technical report writing, competency in the use of proprietary software for both mathematical and graphical analysis of data.

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).

(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).)

(To do course assignments students need to use a software program (see objective 7) that integrates mathematical and graphical analysis of data with word processing.)

(USB drive for use as a work drive with mathematical and graphical analysis software.)

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, CK2000, *Fundamentals of electric circuits*, McGraw-Hill, Boston.

Boylestad, RL2000, *Introductory circuit analysis*, 9th edn, Prentice-Hall, New Jersey.

(USQ Library Call No. 621.3192 Boy)

Carlson, AB & Gisser, DG1990, *Electrical engineering concepts and applications*, 2nd edn, Addison Wesley, Reading, Mass.

- Chapman, SJ2002, *Electric machinery and power systems fundamentals*, McGraw-Hill, Boston.
(USQ Library Call No. 621.31042 Cha)
- Cogdell, JR1997, *Foundations of electrical engineering*, 2nd edn, Prentice Hall, New Jersey.
- Dorf, RC & Svoboda, JA2006, *Introduction to electric circuits*, 7th edn, John Wiley, New York.
- Hambley, AR2005, *Electrical engineering principles and applications*, 3rd edn, Prentice Hall, New Jersey.
- Helfrick, AD & Cooper, WD1990, *Modern electronic instrumentation and measurement techniques*, Prentice Hall, New Jersey.
- Larsen, RW2004, *Introduction to Mathcad 11*, Pearson Education, New Jersey.
(USQ Library Call No. 510.2855369 Lar)
- McKenzie Smith, I1995, *Hughes electrical technology*, 7th edn, Longman Scientific, Harlow, UK.
- Morley, A & Hughes, E1994, *Principles of electricity*, 5th edn, Longman Scientific and Technical, Harlow, UK.
- Morris, NM1994, *Electrical and electronic engineering principles*, Longman Scientific and Technical, Harlow, UK.
- Roadstrum, WH & Wolaver, DH1994, *Electrical engineering for all engineers*, 2nd edn, John Wiley, New York.
- Simpson, CD1992, *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	Objectives assessed	Graduate skill	Level assessed
CMA F1	100	0	22 Apr 2010			
CMA S1B	100	10	22 Apr 2010	3, 4		
ASSIGNMENT	200	20	25 May 2010	2, 3, 4, 6, 7		
CMA F2	100	0	04 Jun 2010			
CMA S2B	100	10	04 Jun 2010	3, 4		
2 HOUR CLOSED EXAMINATION	600	60	END S1 (see note 1)	1, 2, 3, 4, 5		

NOTES

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

IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:
There are no attendance requirements for this course. However, it is the students' responsibility 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 usual method of assessment submission for the Faculty is by written, typed or printed paper-based media (i) submitted to the Faculty Office for students enrolled in the course in the on-campus mode, or (ii) mailed to the USQ for students enrolled in the course in the external mode. The due date for the assessment is the date by which a student must (i) submit the assessment for students enrolled in the on-campus mode, or (ii) mail the assessment for students enrolled in the external mode.
- 5 The Faculty will NOT normally accept submission of assessments by facsimile or email.
- 6 If electronic submission of assessments is specified for the course, students will be notified of this in the course Introductory Book and on the USQ Study Desk. All required electronic submission must be made through the Assignment Drop Box located on the USQ Study Desk for the course, unless directed otherwise by the examiner of the course. The due date for an electronically submitted assessment is the date by which a student must electronically submit the assignment.
- 7 Students who do not have regular access to postal services for the submission of paper-based assessments, or regular access to Internet services for electronic submission, or are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements prior to the submission date.
- 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).
- 10 Harvard (AGPS) is the referencing system required in this course. Students should use Harvard (AGPS) style in their assignments to format details of the information sources

they have cited in their work. The Harvard (AGPS) style to be used is defined by the USQ Library's referencing guide. <http://www.usq.edu.au/library/help/referencing/default.htm>

EVALUATION AND BENCHMARKING

In meeting the University's aims to establish quality learning and teaching for all programs, this course monitors and ensures quality assurance and improvements in at least two ways. This course:

1. Conforms to the USQ Policy on Evaluation of Teaching, Courses and Programs to ensure ongoing monitoring and systematic improvement. 2. Forms part of the Bachelor of Engineering and/or Bachelor of Engineering Technology program and is benchmarked against the: - USQ accreditation/reaccreditation processes which include (i) stringent standards in the independent accreditation of its academic programs, (ii) close integration between business and academic planning, and (iii) regular and rigorous review; and - professional accreditation standards of Engineers Australia.

OTHER REQUIREMENTS

- 1 Students will require access to e-mail and internet access to UConnect 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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