



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: Communication Systems

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ELE	4606	91340	2, 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>	031307

### STAFFING

Examiner: Alexander Kist  
Moderator: John Leis

### REQUISITES

Pre-requisite: (ELE2504 and ELE2601) 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: ELE3506 and ELE4605

### SYNOPSIS

The purpose of this course is to provide an introduction to the specialised techniques and components which are common to both analog and digital communication systems. Topics studied include phase locked loops, noise, modulation methods, electromagnetic propagation, antennas and optical fibre communication. The relevance of these topics is illustrated by reference to existing communication systems such as the telephone network, TV, cellular mobile and microwave radio, radio navigation aids, and satellite communication systems. The course is intended for final year electrical degree students, and assumes some knowledge of electromagnetic fields and Maxwell's equations.

### 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. demonstrate an awareness of standards such as CCIR and CCITT recommendations (Exam);
2. calculate the performance of simple communications circuits (Assignment 1, Computing Assignment, Assignment 2, Exam);

3. calculate the propagation characteristics of electromagnetic waves in free space and in the troposphere (Assignment 2, Exam);
4. analyse the performance of simple aerials and aerial arrays (Assignment 2, Exam);
5. analyse the structure and identify the relationship between various subsystems in modern communication systems (Computing Assignment, Assignment 2, Exam).

## TOPICS

	Description	Weighting (%)
1.	COMMUNICATION ELECTRONICS Transmitter and receiver architecture, frequency synthesis techniques, mixers, modulators and demodulators.	10.00
2.	DIGITAL BASEBAND TRANSMISSION Line codes, spectra, filtering, pulse shaping, eye patterns, PCM.	7.00
3.	DIGITAL MODULATION METHODS FSK, PSK, QPSK etc.	7.00
4.	NOISE Origins, Noise Figure and Temperature, passive networks, and cascaded networks, low noise devices.	7.00
5.	ANTENNAS Simple wire antennas, arrays of identical elements, aperture antennas, Antenna parameters, gain, effective area, aperture taper, spillover, efficiency, polarisation etc.	15.00
6.	PROPAGATION In free space, the ionosphere, the troposphere, refraction, reflection, diffraction, polarisation.	7.00
7.	EXISTING COMMUNICATION SYSTEMS Television, cellular mobile radio and satellite communication.	40.00
8.	OPTICAL COMMUNICATION Types of fibre, propagation, dispersion and loss, light emitting diodes, semi conductor lasers, pin and avalanche detectors, bandwidth. Losses, power budgets and link design.	7.00

## 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).

## 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.

Haykin, S. 1988, *Digital Communications*, John Wiley, New York.

Kraus, JD and Fleisch, DA 1999, *Electromagnetics with applications*, 5th edn, McGraw Hill, Boston.

(International Edition. Also text for ELE4605 Fields and Waves.)

## STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Examinations	2.00
Lectures	39.00
Private Study	55.00
Project Work	26.00
Report Writing	20.00
Tutorials	13.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	100.00	10.00	17 Aug 2009
COMPUTING ASSIGNMENT	200.00	20.00	07 Sep 2009
ASSIGNMENT 2	100.00	10.00	12 Oct 2009
2 HOUR CLOSED EXAMINATION	600.00	60.00	END S2 (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:  
(i) To complete each of the assignments satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for each assignment. (ii) To complete the examination satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for the examination.
- 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 Closed Examination, candidates are allowed to bring only writing and drawing instruments into 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 despatched to USQ within 24 hours 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).

10 A minimum standard of communication skills must be demonstrated in order for a passing grade to be achieved.