

SUBJECT OUTLINE EE3700

HANDBOOK DESCRIPTION:

EE3700 Communication Systems Principles, 3 Units, Student Contribution Band: 2. Administered by the Discipline of Electrical & Computer Engineering.

Prerequisites: EE2201 and MA2000

39 hours lectures, 39 hours design projects, tutorials, demonstrations and practicals, site visits and seminars.

Spectra and Fourier techniques. Spectral shaping. Linear (AM, SSB), Exponential (FM, PM), Pulse (PAM, PWM) and Digital modulation schemes (ASK, FSK, PSK, QAM, MSK) and applications. Signal coding (PCM, Delta Modulation, Sigma Delta Modulation, Vocoders). Baseband coding (NRZ, Manchester). Spread spectrum techniques (CDMA, COFDM). Digital television. Communication Standards for Radio, TV, Mobile Radio and Wireless LAN applications.

Learning Objectives

- demonstrate an ability to communicate this knowledge in written form;
- demonstrate a basic knowledge of the full range of modulation techniques and standards used in analogue and digital communication systems which can then be applied to the design of communication systems.

GENERIC SKILLS TO BE FOSTERED:

Literacy and Numeracy

- the ability to read complex and demanding texts accurately, critically and insightfully
- the ability to speak and write clearly, coherently and creatively
- the ability to generate, calculate, interpret and communicate numerical information in ways appropriate to a given discipline or discourse

Information Literacy

- the ability to find and access information using appropriate media and technologies
- the ability to evaluate that information
- an understanding of the economic, legal, ethical, social and cultural issues involved in the use of information
- the ability to select and organise information and communicate it accurately, cogently, coherently, creatively and ethically
- the ability to deploy critically evaluated information to practical ends

Critical Thinking and Problem Solving

- The ability to think critically, to analyse and evaluate claims, evidence and arguments, and to reason and deploy evidence clearly and logically
- The ability to adapt knowledge to new situations
- The ability to deploy critically evaluated information to practical ends
- The ability to define and to solve problems in Electronic Communication

Self Reliance and Interpersonal Understanding

- The ability to lead, manage and contribute effectively to teams

- the ability to work individually and independently

Using Tools and Technologies

- the ability to select and use appropriate tools and technologies
- the ability to use online technologies effectively and ethically

Learning Achievement

- the acquisition of coherent and disciplined sets of skills, knowledge, values and professional ethics from at least one discipline area
- the ability to reflect on and evaluate learning, and to learn independently in a self directed manner
- the ability to manage future career and personal development

GRADUATE QUALITIES TO BE FOSTERED:

- exemplary personal and professional moral and ethical standards
- a commitment to life-long learning and intellectual development
- an understanding of regional issues
- a sense of professional, community and environmental responsibilities

STAFF:

Lecturer	Room #	Consultations	Email contact	Telephone
A/Prof. Keith Kikkert	DD014-111	Monday 10-1 Friday 9-10:30	Keith.Kikkert@jcu.edu.au	4781 4259

CLASS TIMES:

The nominal lecture, tutorial and practical times are given below. Because of other commitments, there may be some modifications to this schedule. If this occurs, details will be provided by the lecturer during class.

EE3700 Lecture Timetable 2008

Week	Date	Monday 9am	Thursday 10am	Thursday 11am	Thursday 1pm	Friday Noon
1	23-Feb-09	L				
2	02-Mar-09		L	L	L	T
3	09-Mar-09	L	L	L	L	T
4	16-Mar-09	L	L	L	L	T
5	23-Mar-09	L	L	L	L	
6	30-Mar-09					
7	06-Apr-09	T	L	L	L	Good Friday
8	13-Apr-09	Easter	L	L	L	T
Recess	20-Apr-09	Recess	Recess	Recess	Recess	Recess
9	27-Apr-09	L	L	L	L	T
10	04-May-09	Labour Day	L	L	L	T
11	11-May-09	L	L	L	L	T
12	18-May-09	T	L	L	L	T
13	25-May-09	T	L	L	L	T

Practicals 4 Prac Sessions plus one site visit

Practicals: The schedule is available from the subject web site.

ATTENDANCE REQUIREMENTS:

Attendance at all assigned class times is expected. While attendance at prescribed classes is not a component of assessment in any subject, the Head may allow participation in class activities to be an assessment

component, provided that the criteria are made clear to students. There is a high correlation between non-attendance and failure in the subject. You are responsible for all information (both technical and administrative) presented during class times. You should establish informal study groups and one function of these is to give you access to information, if for any reason, you miss a class session.

Students repeating this subject must attend *all* scheduled sessions (lectures, tutorials, practicals, *etc.*), as though they were taking the subject for the first time.

TEXT BOOK/S:

Prescribed Texts

None, some lecture notes are available from this Web site

Reference Texts and Journal Articles

“Communication Systems”, 4th Edition, Simon Haykin, Wiley, 2001

“Communication Systems”, Bruce A Carlson, Paul Crilly and Janet Ruthledge, McGraw Hill, 2002

TEACHING SUPPORT MATERIALS:

Subject Web site: LearnJCU available through Students *ONLINE* on the JCU web site via Current Students <https://www.jcu.edu.au/studentsonline/index.cfm> and www.eng.jcu.edu.au/subjects/cc2510 are both used. Lecture, tutorial, laboratory and resource information for this course will be available via the Web.

E-mail: The CC2510 email alias is activated so please read your email on a regular basis so as not to miss important notices.

EXPECTED CLASS AND STUDY TIME:

The number of class hours in any one week will vary depending on the scheduling of practicals. There will be 3 hours of lectures and 1 or 2 hours of tutorials each week, the four practicals will require three hours each. A report on one practical session is to be written and there is one assignment. Self study outside of class periods will vary from student to student, but you should expect to spend *at least* 6 hours of study in addition to class time each week.

Closed footwear must be worn in room DD014-209. Please refer to the laboratory section in the subject web pages for full details of Laboratory safety requirements.

ASSESSMENT:

For information on the award of grades, policy on supplementary and deferred examinations, see the School of Engineering web page <http://eng.jcu.edu.au/Current%20Students/policy/index.shtml>.

A student must obtain at least an average of 40% over all invigilated components within a subject to pass the subject overall. Invigilated assessment is defined as that which can be solely attributed to the student (i.e. formal quizzes, examination, seminars).

The assessment for this subject is comprised of the following components:

Component	Weighting
Assignments	20%
Practicals	15%
Tutorial Preparation	5%
End of Semester Examination (Invigilated)	60%

Exam (60%). A 2-hour examination in June will be worth 60% of the overall assessment. The primary emphasis will be to test that the student has an understanding of the material outlined in the course, can articulate this understanding and is able to apply this knowledge to solve engineering problems. **You must obtain at least 40% in this examination to pass the subject.**

Tutorial Preparation (5%). Some tutorials problems should be done by the student outside the tutorial periods, and the tutorials session are used to go through the solution of that problem. For some of these (selected at random) a mark will be given for the attempt done by the student.

Assignment (20%). An assignment which trains the student to gather and filter information and present the resulting filtered information in a written report appropriate for a particular audience.

Assessment of the assignment may take into account individual effort, achievement and reporting skills. Details are provided from the Assignment link on LearnJCU. Further information will be provided during class.

Practicals (15%). There are four laboratory sessions for this subject plus one field trip. The practicals require preparation, participation and *individual* reporting. One laboratory session will be written up as a full report and that will be worth 6%, the others will be marked in class and are worth 3% each. Guidelines for the preparation of reports, general lab procedures and safety requirements are available at the 2nd level practical sessions web site: <http://www.eng.jcu.edu.au/subjects/ece2labs/PracProcedures.pdf>.

Note : It is your responsibility to ensure you have a mark recorded before leaving the room when completing a practical that is to be assessed during the laboratory session.

Safety is a very important consideration during practicals. Please see *Safety Requirements for Engineering Buildings* on the School of Engineering web pages at <http://www.eng.jcu.edu.au/resources/studentinfo/.XXX>

ASSESSMENT CRITERIA:

The assessment criteria for the assignment is included in the assignment document. The criteria for the practicals are on the laboratory web site <http://www.eng.jcu.edu.au/subjects/ece2labs/PracProcedures.pdf>

SUBMISSION OF ASSESSMENT:

The practical reports should be submitted to the relevant pigeon hole in stairwell on the first floor of the Electrical Engineering Building DD014. The assignment must be submitted electronically as instructed in the relevant assignment guidelines, through safe assign in LearnJCU on or before the due date, to permit an automatic plagiarism check to be performed on your submission. Late submissions will be penalised at 5% per day or part thereof up to a maximum penalty of 50%. The marks awarded will be placed on the JCU web site. If you are unable to submit any piece assessment, you must seek the approval of the Subject Coordinator. Failing to do so will result in the awarding of an “RW” (*i.e.* Result Withheld) grade for the subject. The grade will remain an “RW” until such time that the outstanding items of assessment are submitted. Outstanding “RW” grades will be automatically converted to a grade of “N” (*i.e.* a failing grade) two weeks after the Publication of Results data. It is therefore in every student’s best interest to submit all items of assessment.

Students repeating this subject must submit all assessable material, as though they were taking the subject for the first time.

Students must check that the grades they receive on their returned on-course assessment items match the grades published by the Subject Coordinator on the subject web page. Any differences between the published and returned grade must be brought to the attention of the Subject Coordinator, so that the calculated grade reflects the true performance of the student.

Items of assessment *not* submitted will be published as DNS (*i.e.* did not submit). Students have until the last day of the Study Vacation to lodge a claim of submission for items granted a DNS. Note that items not submitted will trigger the “RW” rule, detailed above. The assessed work will be returned in lectures/tutorials or can be obtained from the lecturer’s offices.

PLAGIARISM:

Plagiarism is the act of using another’s words, works or ideas from any source as one’s own. Plagiarism has no place in a University. Student work containing plagiarised material will be subject to disciplinary action and may result in exclusion from the University. The University Policy on Plagiarism may be found in the JCU Student Handbook towards the end of the section provided below:

http://www.jcu.edu.au/td/topics/JCUPRD_016786.html

Students should also be aware of the JCU policies relating to Student Academic Misconduct (cheating) found at http://www.jcu.edu.au/policy/student/rights/JCUDEV_005375.html This website also gives help on avoiding plagiarism.

The assignment submissions will be automatically checked for plagiarism. Plagiarise and you will be caught and the University procedures must then be followed.

FINAL GRADE:

The raw marks that you receive from each piece of assessable material will be combined into a total mark for the subject. These raw marks may undergo a scaling process to ensure meeting School and University policies on the distribution of grades. Please see *Assessment Policy* on the School of Engineering web pages at <http://eng.jcu.edu.au/Current%20Students/policy/index.shtml>.

DEFERRED EXAM:

The award of a deferred examination is *not* automatic even if a valid medical excuse is presented. A request for a deferred examination may be refused if the student has a poor record of participation (e.g. failure to attend mandatory sessions, or failure to submit *all* assessable material). Please see *Deferred Assessment Policy* on the School of Engineering web pages at <http://eng.jcu.edu.au/Current%20Students/policy/index.shtml>.

WORKPLACE HEALTH AND SAFETY:

The University staff, management and students have mutual obligations in relation to maintaining a safe workplace and learning environment. Students are required to follow directions specific to sites and safety procedures as directed by staff. Failure to follow safety instructions may result in that person being denied access to the facilities. Please see School of Engineering policy located at the following web site, <http://eng.jcu.edu.au/Current%20Students/policy/index.shtml>

STUDENT SUPPORT:

Some students will have problems that can span a wide range of family, relationship, health, emotional, financial and educational issues. Both the School and University have support systems. We can help, but if problems occur you must seek help promptly. See your lecturer, the Associate Dean (Engineering), or contact Student Services via the web page <http://www.jcu.edu.au/student/>.

Teaching and Learning Development offer help with learning skills such as writing and referencing, preparing for exams, etc at <http://www.jcu.edu.au/learningskills/>

The library staff provide a range of support services for IT access and library issues <http://www.library.jcu.edu.au/InfoHelp/Training/>

STUDENTS WITH DISABILITIES:

Students with a disability who require special arrangements or consideration should contact the Associate Dean (Engineering) and the Disability Resource Centre at <http://www.jcu.edu.au/office/disability/>.

EE3700 Course Outline

Introduction	3 Lectures
Background	
Spectra and Fourier Techniques, Fourier Transform	
Time and Frequency Division Multiplexing	
Linear Modulation- AM, DSB and SSB	5 Lectures
Theory	
Spectra and Power	
Hilbert Transform	
Generation and Demodulation of AM	
Exponential Modulation- FM and PM	5 Lectures
Theory	
Spectrum of FM	
Bandwidth and Carsons Rule	
Stereo FM	
FM Broadcasting standards	
Generation and Demodulation of FM	
Pulse Modulation	1 Lecture
PAM, PWM	
Aperture Effect	
Time and Frequency Division Multiplexing	
Code Modulation	4 Lectures
PCM	
Delta Modulation	
Companding	
Vocoders	
Data Modulation	4 Lectures
ASK, FSK, CFSK	
BPSK, QPSK, DQPSK, OPSK, MSK	
QAM	
Baseband Transmission	3 Lectures
Nyquist Pulse Shaping	
Partial Response Signalling	
Equalisation, Eye Diagrams, Baseband Coding	
Channel Coding	3 Lectures
Block, Hamming, Cyclic, Convolutional and Trellis Coding	
Spread Spectrum Techniques	4 Lectures
Frequency Hopping, CDMA , COFDM, ADSL	
Digital Radio Systems	3 Lectures
Mobile and Cordless Phones	
Wireless LAN	
Bluetooth	
Television and Radio Standards	4 lectures
PAL, DAB and Digital TV.	