



SUBJECT OUTLINE

EE3300:03 Electronics 2

(Teaching Period 2, 2007)

Campus: **Townsville** and Mode of Offering: **On Campus**

HANDBOOK DESCRIPTION:

65 hours of lectures, design projects, tutorials, demonstrations and practicals, site visits and seminars. Semester 2, HECS Band 2.

Tuned amplifiers and oscillators. Power supplies: linear and switched mode. Large signal and power amplifiers (Class A, B, C, D). Feedback, frequency compensation of operational amplifier circuits. Practical operational amplifier circuits. Electronic multipliers and comparators. Planning, managing and implementing a Group Design Project.

LEARNING OBJECTIVES AND OUTCOMES:

1. Ability to plan, manage and implement a group project to meet set milestones, budget and performance specifications;
2. To develop an understanding of the principles and constraints of designing electronic circuits;
3. To develop the capability to design regulated power supplies, oscillators and amplifiers;
4. To write design proposals, a design report and present a seminar on an electronic design project.
5. To develop effective written, oral and graphical communication skills.

GENERIC SKILLS:

Literacy and Numeracy

- 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 at least one discipline area

Self Reliance and Interpersonal Understanding

- The ability to communicate effectively with a range of audiences

- The ability to lead, manage and contribute effectively to teams
- the ability to work with people of different gender, age, ethnicity, culture, religion and political persuasion
- 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:

- exemplary personal and professional moral and ethical standards
- a commitment to life long learning and intellectual development
- a sense of professional, community and environmental responsibilities
- willingness to contribute to the intellectual, cultural and social life of the regional, national and international communities

STAFF:

Lecturer	Room #	Consultation	Email contact	Telephone
Mr. John Wicking (Subject Coordinator)	DD014-108	Appointment preferred	john.wicking@jcu.edu.au	4781 6908
A/Prof Keith Kikkert (Subject Coordinator)	DD014-111	Open door policy. Appointment preferred	Keith.Kikkert@jcu.edu.au	4781 4259
Tutor				
To be advised		In practical		

CLASS TIMES:

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

Lectures:	Wednesday (JW)	10:00	DD014-006
	Wednesday (JW)	11:00	DD014-006
	Thursday (JW)	10:00	DD014-006
	Thursday(JW)	12:00	DD014-201
Tutorials:	Wednesday (KK)	16:00-18:00	DD014-006
	Wednesday (JW)	12:00	DD014-006
Practicals¹:	Tuesday	10:00-13:00	EL007/EL209
	Tuesday	14:00-17:00	EL007/EL209
	Thursday	14:00-17:00	EL007/EL209

¹ Practicals are not scheduled each week. 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. You are responsible for all information (both technical and administrative) presented during class times. You should establish informal study groups, which will 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

The following text book is strongly recommended.

“Electronic Devices and Circuit Theory” Eighth Ed. by Robert Boylestad & Louis Nashelsky

ISBN: 0-13-028483-1, Publisher: Prentice Hall, Copyright: 2002, Format: Cloth; 1020 pp Published: 07/19/2001

Reference Texts and Journal Articles

"Microelectronic Circuits" by RASHID, M.H., Nelson Thomson ISBN 053495174-0

Various application notes on Web site.

TEACHING SUPPORT MATERIALS:

Subject Web site: <http://www.eng.jcu.edu.au/subjects/ee3300/>

Complete lecture, tutorial and laboratory information (Timetable and Practical notes) for this course will be available via the Web.

E-mail: The EE3300 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 normally be 3 hours of lecture/ project meetings and 1 hour of tutorial each week and the three practicals will require 2 to three hours each. 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.

MATERIALS AND SERVICES TO BE PURCHASED:

None.

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
Practicals	10%
Design Project	40%
End of Study period Examination (Invigilated)	50%

Exam (50%). One, 2-hour exam in November will cover all aspects of the subject. Details to be discussed by lecturer shortly before the end of Study period. **You must obtain at least 40% in this examination to pass the subject.**

Group Project (40%). Assessment of the Group Project takes into account individual effort, achievement, reporting and oral presentation skills. Details are provided from the Group Project link on the EE3300 Web site. Further information will be provided during project meetings.

Practicals (10%). The practicals require preparation, participation and individual reporting. Three practicals are scheduled. See the subject web page for details of laboratory procedure, assessment and reporting requirements.

ASSESSMENT CRITERIA:

The criteria by which each piece of assessment will be evaluated will be presented and discussed at the start of the practical or project.

SUBMISSION OF ASSESSMENT:

It is expected that all assessment for this subject will be submitted, since every student needs to demonstrate mastery of the material to satisfy the Accreditation requirements of Engineers Australia. Assessments may include, but are not limited to, tutorials, assignments, practical reports, site visit reports, literature reviews, project reports, seminars, *etc* Failing to do so may 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. Note that “RW” grades eventually convert to a grade of “N” (*i.e.* a failing grade) after a period of time after the completion of the subject. **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 LearnJCU or 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. Claims lodged after this date will not be considered. Claims should be lodged with the Subject Coordinator.

The three practicals will be assessed based on an email submission of results obtained during the lab session (3.3% of final mark each). See the subject web page for more details of the laboratory schedule, procedure, assessment and reporting requirements.

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 2006 towards the end of the section provided below:

http://www.jcu.edu.au/courses/handbooks/2006/155_examinations.html#PLAGIARISM

Note that under this policy ALL cases of expected plagiarism MUST be reported to the Head of the School who will then call the student to a meeting to determine appropriate action.

Students should also be aware of the JCU policies relating to Student Academic Misconduct (cheating) found at the same web address. For help in avoiding plagiarism see

<http://www.jcu.edu.au/studying/services/studyskills/reference/>

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>.

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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/studying/services/>.

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

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/>.

SYLLABUS:

This course consists of two parts; a conventional lecture course and a group project component. The lecture section of the course consists of about 20 lectures which will be presented via 4 lectures and one tutorial per week. The Group Project will be run over the whole of the Study period.

Section A (10 Lectures) – Mr. J. Wicking

- Computer simulation and modelling (1)
- Small signal linear transistor model (1)
- Amplification (2)
 - Circuits (Common emitter, base and collector)
 - Long-tailed pair (Differential Amplifier)
 - Amplifier modules (EAR, MAR)
- Switching (2)
 - Small signal (Relay, analogue switch, diodes)
 - Power (Diode, Transistor, FET, Others)
- Generation (2)
 - Current Sources
 - Oscillators (Phase shift, Function generator, DDS, Crystal, Gunn, 555 timer)
- Power Supplies (2)
 - Switch mode Regulators
 - Protection circuits (SCR)

Section B (10 Lectures) – Mr. J. Wicking

- Power Amplifiers (Class A, B, A-B, C and D) (3)
 - Review of small signal amps and biasing
 - Operation and analysis (efficiency)
 - Circuits (Biasing, Op-Amp input)
- Practical Operational Amplifiers (5)
 - Limitations (Offsets, slew rate, BW, Zin/ Zout etc)
 - Stability and compensation
 - Effect of feedback on gain, bandwidth & distortion
- Specialised Op-amps (2)
 - Low noise, current output, high speed op-amps

EE3300 2006 Timetable							
Date	Week No	Wednesday 10:00 Lecture	Wednesday 11:00 Lecture	Wednesday 12:00 Tutorial	Wednesday 16:00 Project	Thursday 10:00 Lecture/Tute	Thursday 12:00 Lecture
30-Jul	1	L1	L2		P1	L3	As Req'd
06-Aug	2	L4	L5	T1	P2	L6	As Req'd
13-Aug	3	L7	L8	T2	P3	L9	As Req'd
20-Aug	4	L10	L11	T3	P4	L13	As Req'd
27-Aug	5	L14	L15	T4	P5	L16	As Req'd
03-Sep	6	L17	L18		P6	T5	As Req'd
10-Sep	7	L20	L21	L22	P7	T6	As Req'd
17-Sep	8	EE3400	EE3400	EE3400	P8		EE3400
24-Sep	Recess			Recess			Recess
01-Oct	9	EE3400	EE3400	EE3400	P9	EE3400	EE3400
08-Oct	10	EE3400	EE3400	EE3400	P10	EE3400	EE3400
15-Oct	11	EE3400	EE3400	EE3400	P11	Project	EE3400
22-Oct	12	EE3400	EE3400	EE3400	P12	Project	EE3400
29-Oct	13	EE3400	EE3400	EE3400	P13	Project	EE3400