THE UNIVERSITY OF NEW SOUTH WALES
SCHOOL OF ELECTRICAL ENGINEERING & TELECOMMUNICATIONS

ELEC2133 – ANALOGUE ELECTRONICS
SUMMER SESSION – 2009-2010

GENERAL COURSE INFORMATION
AND ASSESSMENT CRITERIA

Lecturer-in-Charge: Prof. Chee Yee KWOK
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Teaching Assistant/Mentor: Jarryd Pla
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Lab Demonstrators: TBA

Consultations:
Your teaching assistant/mentor will be your main source of assistance for ELEC2133. Please direct all communication to him in the first instance. If he cannot assist you, then you may direct your communication to Prof. Kwok.

Your mentor will be available online regularly and will be providing a consultation time for which students can discuss technical and other issues in the course.

Contact Hours:
The course consists of pre-recorded lecture videos provided for online download. Contact hours are restricted to Week 4 and Week 8 of session for labs and tutorials only. There are 18 hours of lab and 12 hours of tutorial in total.

The summer session officially runs over two periods, Period A from 23/11/09-18/12/09, and Period B from 4/01/10-29/01/10.

Tutorials: Week 4 and Week 8 only
Monday, Wednesday, Thursday, 2pm-4pm,
14/12, 16/12, 17/12, 25/01, 27/01, 28/01

Laboratories: Week 4 and Week 8 only
Monday, Wednesday, Thursday, 10am-1pm,
14/12, 16/12, 17/12, 25/01, 27/01, 28/01
1. AIMS AND SCOPE

The aim of this subject is to further develop skill and knowledge in the analysis and design of electronic circuits. The conceptual knowledge gained in second-year electronics will be applied to specific use in real circuits. The first half of the course will focus on the design and analysis of multi-stage linear amplifiers/operational amplifiers in terms of its frequency response, effects of feedback and stability. The second half deals with non-linear circuits like Schmitt triggers, comparators, waveform generators and building blocks for electronic communication circuits, like A-D and D-A converters. This subject endeavours to teach students not only just how to solve circuit problems but also develop a more thorough understanding of why circuits behave in a certain way and how performance can be improved. The topics to be covered include the following:

- frequency analysis of amplifiers
- design and analysis of feedback amplifiers
- amplifier stability analysis
- operational amplifiers and comparators
- Schmitt trigger circuits
- waveform generators
- analogue-to-digital and digital-to-analogue converters

2. PREREQUISITES

The prerequisite for Analogue Electronics is ELEC2134 (Circuits and Signals). Students are strongly advised to revise any unfamiliar topics in their own time.

3. REFERENCES

The textbook set for this course is:


Additionally, you may find the following reference books helpful:

4. LECTURES

The entire course will be delivered in a new mode of teaching, using pre-recorded video lecture presentations. You will need to watch these video lectures in your own time before the tutorials and labs in Weeks 4 and 8. Advantages of the video recordings are:

- You will be able to watch them at your own pace.
- You can revisit the lecture content as many times as you like.
- Things that you might miss in a normal live lecture (e.g. difficult mathematical concepts) are available on the recording.

It is essential that students view all lectures. Lecture notes will be progressively made available on the course WebCT website.
Note that not all video recordings will be released at once. Upon downloading and viewing a set of lectures, students will be required to undertake a small quiz on WebCT before being allowed to proceed to the next lecture set. These quizzes are NOT assessable and will NOT contribute to your final grade. They are simply to ensure that students are viewing the lecture recordings.

5. LEARNING OUTCOMES AND ATTRIBUTES
After the successful completion of the course, the student will be able to:

1. Understand the basics of analog circuit design and its limitations.
2. Developed an intuitive feel for circuits analysis and design.
3. Analysis of analog circuits to determine frequency response, stability and feedback topologies.
4. Analyse and understand the behaviour of oscillators.

The course delivery methods and course content address a number of core UNSW graduate attributes; these include:
1. The capacity for analytical and critical thinking and for creative problem-solving, which is addressed by the assignments, laboratory and tutorial exercises.
2. The ability to engage in independent and reflective learning, which is addressed by the lectures, assignments, tutorials and laboratory work.
3. The skills of effective communication, which are addressed by the lab reports and oral assessments.

Please refer to http://www.ltu.unsw.edu.au/content/userDocs/GradAttrEng.pdf for more information about graduate attributes.

6. ASSESSMENTS
Assessments in this subject will be based on the following scheme:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory (Experiment 1 &amp; 2)</td>
<td>20%</td>
</tr>
<tr>
<td>Assignments (2)</td>
<td>15%</td>
</tr>
<tr>
<td>Assignment 1 due Week 5, Wed January 6</td>
<td></td>
</tr>
<tr>
<td>Assignment 2 due end of Week 8, Fri January 29</td>
<td></td>
</tr>
<tr>
<td>Final Exam</td>
<td>65%</td>
</tr>
<tr>
<td>Date to be confirmed, but held</td>
<td></td>
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<tr>
<td>in the week starting February 1 2010</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
<tr>
<td>4 bonus marks will be awarded to those who complete Experiment 3</td>
<td></td>
</tr>
</tbody>
</table>

You must pass both the laboratory component (Exp.1&2) and the exam component to attain an overall pass in the course.

7. THE COURSE WEBSITE
The WebCT Vista portal, http://vista.elearning.unsw.edu.au/, will be the primary point of contact, for administrative matters, with the student. Any important announcements will be placed on the ‘Announcements’ page, which the student is obliged to check regularly. Links to lecture videos, lecture notes, tutorial questions, lab notes, assignments and other course materials will also be made available for download from WebCT.

Those unfamiliar with WebCT should consult the following website, which contains instructions and other resources for students http://support.vista.elearning.unsw.edu.au/content/default.cfm?ss=0.
8. LABORATORY WORK

Electronics is very much an experiment-oriented subject. Successful practical implementation of designs and effective reporting of results are of crucial importance in developing your skills as a competent electronics engineer.

A pass grade in Experiments 1 and 2 is required to pass this subject. Each experiment contributes 10% to the overall course mark. Experiment 3 is for students to attempt if they want to gain bonus marks (4 marks), provided they have completed experiments 1 and 2.

The preliminary preparation for each laboratory experiment must be completed before the relevant laboratory session. The circuits to be constructed have values that depend on the results of the design carried out in the preliminary work. You will not be able to construct the circuit correctly without having completed the preliminary preparation.

Keeping systematic notes is an important aspect of experimental technique. Your laboratory notebooks should be the primary record of your design and calculations and results of your experiments. The preliminary preparation should be done in the laboratory notebook. Results, measurement and observations should be recorded directly into the notebook as they are gathered (and not on loose scraps of paper). Except when drawing circuits and waveforms, pen must be used rather than pencil. There is no need to do a ‘draft’ and then a ‘good copy’ — this merely wastes time.

Laboratory notes should be downloaded from the subject website. The experiments are:

- **Experiment 1** Operational Amplifier — compulsory (nominally 2 x 3hr lab-periods)
- **Experiment 2** Feedback Amplifier — compulsory (nominally 2 x 3hr lab-periods)
- **Experiment 3** Waveform Generators - bonus marks (4 marks)

Laboratory sessions are scheduled in Weeks 4 and 8 as detailed in the Contact hours. Please take careful note of the laboratory experiment completion deadlines, as outlined in Section 8.2.

### 8.1 LABORATORY ARRANGEMENT

Students are required to provide their own breadboard, inscribed with their student number, to each laboratory session. Construction and testing of all circuits must be carried on his/her own breadboard. Using another student’s breadboard is regarded as infringement of university examination regulations. Breadboards may be purchased from the workshop in G24. A pair of needle-nose pliers and wire strippers would also be useful.

You are expected to work on the experiment on your own and copying is an infringement of university examination regulations. Discussion on experimental work is encouraged, but over zealous assistance should be avoided.

### 8.2 DEADLINE FOR MARKING OF LABORATORY WORK

The following deadlines exist for Experiments 1 and 2:

- **Experiment 1**: Thursday, Week 4, 17/12/09
- **Experiment 2**: Wednesday, Week 8, 27/01/10

Your experimental work must be written up and marked by this date, even if you have not completed the entire laboratory exercise. A penalty will be applied once the deadline has elapsed. 10 points will be deducted for each 3hr lab period. Even if you have no points left, you must still satisfactorily complete the laboratory work to pass the course.
Students are strongly encouraged to start Experiment 2 on the lab session when Experiment 1 is marked.

8.3 ASSESSMENT OF LABORATORY WORK

(i) All preliminary preparation, results of experimental measurements and discussion of results must be neatly recorded in a laboratory book. Work presented in loose sheets will NOT be marked.

(ii) Assessment of your work will be conducted orally. It is the student’s responsibility to organise the documentation of his laboratory work in a fashion that shows his/her understanding and achievements. During the oral examination, students are expected to demonstrate the operation of their circuit. Do not dismantle the circuit until you have received a written clearance in your laboratory note book that the assessment is complete.

(iii) Each experiment will be marked out of 20 points.

(iv) Marking will only be done during the laboratory period by the demonstrators present. It is the responsibility of the students to make sure that his/her mark is recorded by the demonstrator.

8.4 LABORATORY ATTENDANCE

Attendance at scheduled laboratory classes is mandatory. Should a class be missed for medical reasons, a medical certificate must be presented.

9. TUTORIALS

Tutorials are scheduled for Weeks 4 and 8 as outlined in the Contact hours. These tutorials will be used to discuss the tutorial questions, which will be available for download from the course WebCT.

10. ASSIGNMENTS

There are also two compulsory written assignments for this course, which will be released on the course WebCT after Week 2 and 5 respectively. The assignments will be worth 15% of the overall mark in total for this course. It is expected that the students complete assignments on their own. Assignment submission is tentatively set in Week 5 on January 6 for Assignment 1 and the end of Week 8 for Assignment 2.

11. FINAL EXAM

There will be a 3 hour final exam to be held in the week after Week 8. The date is to be confirmed, but will be held in the week starting February 1 2010.

12. PLAGIARISM

Students found guilty of academic misconduct, in particular plagiarism - including excessive collaboration, copying another’s assignment, or allowing one’s assignment to be copied by another student - will not receive any marks for that assignment. In addition, any plagiarism will be referred to the Head of School for further action. Plagiarism is considered a serious offence by the University
and severe penalties may apply. For more information about plagiarism, see http://www.lc.unsw.edu.au/plagiarism/index.html.

12. CONTACT INFORMATION

All queries or concerns about Analogue Electronics should be directed, in the first instance, to the Teaching Assistant at jarryd@unsw.edu.au. Please ensure that the subject line of any e-mail sent is informative and includes the word ‘ELEC2133’.