FACULTY of Engineering

SCHOOL of Electrical Engineering & Telecommunications

ELEC 1111

Electrical and Telecommunications Engineering

SUMMER SESSION, 2009-2010
ELEC1111
Electrical and Telecommunications Engineering

COURSE INTRODUCTION – Summer, 2009-2010

Course staff
Course convener: Dr Ray Eaton, Room G6, E-mail: r.eaton@unsw.edu.au
Mentor/Tutor: Ning Wang, E-mail: NingWang@unsw.edu.au
WebCT Assistant: Jiong An, jiongan@ee.unsw.edu.au

Consultations:
Your mentor and tutor will be your main source of assistance for ELEC1111. Please direct all communication to him in the first instance. If he cannot assist you, then you may direct your communication to Dr Eaton.

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.

Course details

Credits (UOC)
Course Elec 1111 is 6 UOC

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 24 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, Thursday, Friday, 2pm-4pm,
14/12, 17/12, 18/12, 25/01, 28/01, 29/01

Laboratories: Week 4 and Week 8 only
Wednesday, 10am-1pm, 16/12 and 27/01
Wednesday, 2pm-5pm, 16/12 and 27/01
Thursday, 10am-1pm, 17/12 and 28/01
Friday, 10am-1pm, 18/12 and 29/01
Course Information

Context and aims
ELEC1111 is an introductory course in Electrical Engineering. It gives an overview of the fundamental aspects of electrical and telecommunications engineering. The course provides an introduction to electrical and telecommunications principles and provides basic technical skills to analyse simple circuits. In the practical section it provides hands-on experience in building and testing circuits. It is packaged in such a way that students, having taken this course, can go away and build some practical, useful devices afterwards. It is a pre-requisite for the subsequent course on Circuits and Signals.

Course Objectives:
At the end of the course you should be able to:
(a) Have an overview of what can be achieved with electrical engineering.
(c) Understand elementary concepts of electrical and telecommunications circuits, and their analysis.
(d) Be familiar with basic laboratory equipment and techniques to measure electrical quantities.

Relation to other courses
This course is an introduction to electrical engineering for both electrical and telecommunications engineering students and engineers in general across the faculty. It is a pre-requisite for many other courses both in electrical and other engineering schools.

Pre-requisites:
There are no pre-requisites for this subject but it would be helpful to have a physics and mathematics background at high school level.

Assumed knowledge:
Working knowledge of basic mathematics including differentiation and integration techniques.

Student learning outcomes
After the successful completion of the course, the student will be able to
- Have an understanding of the breadth of Electrical and Telecommunications through exposure to an overview of Energy Systems, Telecommunications and Control Systems.
- Use Kirchhoff’s laws, circuit theorems and node voltage methodology to solve simple circuits,
- Be able to solve simple 1st order transient circuits.
- Apply simple steady state sinusoidal analysis to circuits.
- Have a basic understanding of transformer operation.
- Have an understanding of ideal operational amplifier application circuits
- Understand simple combinational logic circuits.

Contribution of course to graduate attributes:
- Development of knowledge and a basic understanding in the main areas of energy, control, and telecommunications.
- Development of analytical and critical thinking (via laboratory work and creative problem solving).
- The ability to engage in independent and reflective learning, which is addressed by the laboratory exercises.

Please refer to [http://www.ltu.unsw.edu.au/content/userDocs/GradAttrEng.pdf](http://www.ltu.unsw.edu.au/content/userDocs/GradAttrEng.pdf) for more information about graduate attributes.
Teaching strategies

Delivery mode
The teaching strategies employed in this course are new, in so far as the lectures will not be face-to-face, but provided as pre-recorded videos available for online download. In addition, tutorials and laboratories are carried out in "block-mode", where students are required to attend in Weeks 4 and 8 only, where they will undertake all labs and tutorials in an intensive fashion.

The teaching in this course aims at establishing a good fundamental understanding of the areas covered by using the lecture material, tutorials which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material and laboratory sessions which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.

Course schedule

Lectures = 36 hrs/8 weeks, Tutorial = 12 hrs/8 weeks Labs = 24 hrs/8 weeks

Indicative lecture schedule over 8 weeks:

<table>
<thead>
<tr>
<th>Period</th>
<th>Lecture Set No</th>
<th>Summary of Lecture Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1-4</td>
<td>1</td>
<td>Introduction, Circuit Basics Overview + Lab Safety.</td>
</tr>
<tr>
<td>Week 1-4</td>
<td>2</td>
<td>Kirchhoff's laws</td>
</tr>
<tr>
<td>Week 1-4</td>
<td>3</td>
<td>Power &amp; Energy, Series &amp; Parallel</td>
</tr>
<tr>
<td>Week 1-4</td>
<td>4</td>
<td>Node Equations &amp; Circuit analysis</td>
</tr>
<tr>
<td>Week 1-4</td>
<td>5</td>
<td>Thevenin &amp; Superposition Theorems</td>
</tr>
<tr>
<td>Week 1-4</td>
<td>6</td>
<td>Circuit analysis + intro to inductors and capacitors</td>
</tr>
<tr>
<td>Week 5-8</td>
<td>7</td>
<td>1st order Transients</td>
</tr>
<tr>
<td>Week 5-8</td>
<td>8</td>
<td>Intro to Sinusoidal analysis</td>
</tr>
<tr>
<td>Week 5-8</td>
<td>9</td>
<td>Transformers</td>
</tr>
<tr>
<td>Week 5-8</td>
<td>10</td>
<td>Op amps</td>
</tr>
<tr>
<td>Week 5-8</td>
<td>11</td>
<td>Intro to Telecom</td>
</tr>
<tr>
<td>Week 5-8</td>
<td>12</td>
<td>Digital Logic</td>
</tr>
</tbody>
</table>

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.

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.

Laboratory

Students are required to attend laboratory in Week 4 and Week 8 as outlined in the Contact hours on Page 3.
Tutorials
Students are required to attend tutorials in Week 4 and 8 as specified in the Contact hours on Page 3.

Note that no marks are awarded directly for any part of the tutorial program in this course. However, they should still be treated as an important aspect of the course, not to be taken lightly. There are two components of the tutorial program:

1. Sets of problems are provided to give the student personal practice in solution and understanding. These problems will be related to recent lecture material with an emphasis on the basic concepts.

2. Demonstrations of important problem solving techniques by tutors.

3. Occasional quizzes will be held during the tutorial periods to allow the students to assess their own progress in the course.

Assessment
You are expected to view all lectures, and attend all tutorials, labs and quizzes, in order to maximize learning. It is a UNSW requirement that you attend at least 80% of your classes. You should prepare your tutorial questions in advance of attending the tutorial classes. You must prepare well for your laboratory classes, and will be tested on this preparation at the beginning of each lab exercise. In addition to the lecture notes, you should read relevant sections of the recommended text. Reading additional texts would further enhance your learning experience. Group learning is also encouraged.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Assessment</th>
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<tbody>
<tr>
<td>1. Laboratory Practical Experiments</td>
<td>10%</td>
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<tr>
<td>2. Laboratory Practical test</td>
<td>5%</td>
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<tr>
<td>3. Quizzes - two in total</td>
<td>20%</td>
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<tr>
<td>Week 4 – Friday, Dec 18, 5pm</td>
<td></td>
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<tr>
<td>Week 8 - Thursday, Jan 28, 5pm</td>
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<tr>
<td>4. Final written examination</td>
<td>65%</td>
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<tr>
<td>Date to be confirmed, but held in the week starting February 1 2010</td>
<td></td>
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<tr>
<td>TOTAL</td>
<td>100%</td>
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</tbody>
</table>

As shown in the table above, there are three components to the overall assessment, namely:

1) Laboratory assessment: after completing each experiment, your work will be assessed by the laboratory demonstrator. A practical test will be run during the laboratory period in Weeks 8. You have to attend at least 80% of the labs AND attain a pass assessment in labs AND pass the lab test to pass the course.

Students must hand in a signed safety form before starting the practical laboratory component. If a student attends laboratory sessions without having submitted a signed safety form the marks for those labs will be zero.

A satisfactory performance in the laboratory component is a necessary requirement to pass this course. This means that even if you score 100% on the final written examination and on the quizzes, you will not pass the course if your laboratory assessment is not satisfactory.
**In Summary** to pass the laboratory component and therefore the course you MUST do all of the following:

- **Hand in a signed Safety Form.**
- **For Elec1111 during Weeks 4 and 8 you must attend all of the lab classes including the lab test (or have handed in medical certificates)**
- Obtain a pass mark average for the laboratory experiments.
- Pass the LAB EXAM.

2) **Quizzes:** there will be two 45-minute quizzes during session as scheduled above. Repeat students are NOT exempt from these tests.

**Note:** For all class assessment tasks i.e. Laboratory and quizzes, if the student is unable to attend for medical or other serious reasons (i.e., a death in the family) the student must present medical certificates and/or other documentation within 3 days of the assessment to the lecturer in charge. If this is not done within the required time period then no consideration will be given. In the case of missing a quiz for one of the reasons above, the assessment will be carried over to the final exam i.e. the final exam will become a higher % of the assessment.

**Final examination:** the final exam will be a closed book exam 3 hour for elec1111. In principle, the examination may cover any aspect of the course that has been presented in lectures, tutorials and/or laboratories. You **MUST achieve at least 35%** in the final exam to pass the subject.

Note: For repeat students who have a laboratory exemption, the laboratory exam mark from the previous years will not be counted again, but the final examination will be worth a higher % of their final mark. A laboratory exemption is only available, on application (forms available from School of EE&T Office), to students who had a satisfactory laboratory assessment. All other students who have previously failed this course are expected to attend at their scheduled laboratory times and to repeat all aspects of the laboratory.

If required, a *supplementary examination* for any student granted one by the School for major and documented medical reasons will be held after the exams results are released. Check with EE&T school office for dates. The supplementary examination may be an oral exam where small numbers of students are involved.

**Warning about 1st Year**

In a survey of students at the end of 1st year by far the majority agreed that 1st year Uni was much harder than the HSC. Do not treat 1st year lightly!

**How to fail this course**

The following points may be read in a light-hearted manner if you are certain that they never apply to you. However, it is a sad fact of life that there are too many students who get caught out by their attitude to study only to find that a failure in this course has severely affected their progress in the degree program. Read carefully. Be aware of any such bad habits and take appropriate action while there is still time.

1) Plan my time badly. There is plenty of time before the next test, exam or deadline for a report.

2) Don't bother to view lectures; a photocopy is just as good.

3) There is no need for me to prepare for the next laboratory as I can always use the first half of the laboratory period for that purpose.

4) There is no need to actually involve myself in the lab, my partner can do most of the work. (Remember the lab test is done individually not as a group!)
5) There is no need to try any of the set problems at the moment as I shall easily understand the solutions when I download them later in the Session. Better still, my friend may already have done the download and print!

6) I may forget to turn up, or better still, I shall turn up at the wrong place and/or time, for a test or examination.

7) There is no need to plan my time in other courses; I can always catch up by skipping this course for a couple of weeks.
Academic honesty and plagiarism

What is Plagiarism?
Plagiarism is the presentation of the thoughts or work of another as one’s own.* Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person’s assignment without appropriate acknowledgement;
- paraphrasing another person’s work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle
† Adapted with kind permission from the University of Melbourne.
Resources for students

Course web site

The course web site is at: http://vista.elearning.unsw.edu.au/

You will need your student ID and password to log on. It is important that you check this web site weekly. It serves as the class notice board where all important messages about this particular course are posted. In addition, students can download lecture notes, lab notes, tutorial handouts and other course-related materials. Also, links to some useful web sites are provided. As the course progresses, students’ marks from assessments such as labs and quizzes are available for personal viewing on this website.

Recommended Text(s):
For those proposing to continue in electrical & telecommunications engineering:
- “Fundamentals of Electric Circuits” Alexander & Sadiku, McGraw Hill. (This is also the new text for 2nd yr EE.)
For those proposing to follow other areas
- “Electrical Engineering Principles and Applications” Allan R Hambley, Prentis Hall.

Further Text(s) and Reference(s):
The reference books provide further reading in electrical engineering as well as a detailed treatment of circuit theory and digital circuits.

1) L.S. Bobrow, Elementary Linear Circuit Analysis, Oxford, 1987 [P621.3192/106]. This was the previous text for this course and also for ELEC2031.

The Learning Centre UNSW

Online academic skills resource library:
http://www.lc.unsw.edu.au/olib.html

Interactive resource on avoiding plagiarism & academic integrity:
http://www.lc.unsw.edu.au/plagiarism/

First steps information for new students
http://www.lc.unsw.edu.au/firststeps/

The Learning Centre offers individual consultation on drafts of assignments and also runs academic skills workshops see:
http://www.lc.unsw.edu.au
Course improvement

This course is continually under review and constructive student feedback is always valued. Periodically student evaluative feedback on the course is gathered, using among other means, UNSW's Course and Teaching Evaluation and Improvement (CATEI) Process. Student feedback is taken seriously, and continual improvements are made to the course based in part on such feedback.

Administrative Matters

It is important that students familiarise themselves with all the School of Electrical Engineering and Telecommunications policy and procedures. These are available at: http://scoff.ee.unsw.edu.au/information/information.htm
The major information headings are listed below.

Information for Current Students

USE OF EE&T FACILITIES

- Laboratory Regulations and Safety
- Evacuation Procedures
- OHS
- First Aid
- Locker hire

ACADEMIC ISSUES

- The Learning experience
- Submission of Written Work
- Resubmission
- Late Submission
- Plagiarism and Academic Honesty
- UNSW Examination Rules
- Special Consideration, Illness and Misadventure
- EE&T Supplementary Assessment Policy
- Supplementary Examinations
- Attendance
- Conduct
- Academic Standing
- Grading
- Grievance Procedures

Equity and diversity: those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or www.equity.unsw.edu.au/disabil.html). Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made. Information on designing courses and course outlines that take into account the needs of students with disabilities can be found at: