GRIFFITH UNIVERSITY, GOLD COAST

SCHOOL OF ENGINEERING

2074ENG - ANALOG ELECTRONICS

Course Outline

1.0 Course Identification

Year/Semester(s): Semester 2, 2002

Course Level: 2nd Year.

Program(s) Status: Bachelor of Engineering in Multimedia Telecommunication (core)
BEng in Eng – (Transfer Course; Microelectronics) (core)

Credit Value: 10 CP

Prerequisite(s): 2076ENG - Circuit Design
1016ENG - Physics and Instrumentation

Teaching Team:

Convenor:	Charles Hacker	Room No: G09 1.24 (ENG)
Moderator:	David Edwards	Room No: G09 1.26 (ENG)

2.0 Objectives

2.1 Familiarity with electronic devices and circuits is fundamental to electronic and electrical engineers. This course develops specific concepts of analog electronics, and incorporates relevant circuit theory.
This course compliments other courses in digital electronics.

2.2 The main purpose of this course is to provide sound knowledge of the principles and practices of analog electronics, both at the device and circuit level. It reflects the primary purpose of the program to provide a practical, thoroughly professional engineering education. This course has a strong emphasis on practice, which complements the knowledge provided in the underlying electronics theory.

2.2 Upon successfully completing this course, students should be able to:

1. Describe the operation and typical application of common discrete semiconductor devices; such as diodes, triacs, diacs, thyristors, LED's, and transistors.
2. Be familiar with the concepts of amplification and signal processing, through the use of transistors and operational amplifier circuits.
3. Be able to design a wide range of electronic circuits such as timers, amplifiers, power supplies, filters, and selected communication circuits.
4. Demonstrate competence in the breadboarding and testing of electronic circuits; using oscilloscopes, multimeters, signal generators, and power supplies.

In addition to the specific course objectives, overall program objectives of developing the students' teamwork and presentation skills, both oral and written, will be pursued at every opportunity.

3.0 Brief Description

This course covers topics in analog electronics and advanced circuit theory. This includes: discrete semiconductor devices, semiconductor integrated circuits, amplifiers, negative and positive feedback, power supplies, and selected circuits used in communication systems.

Assessment is by: Laboratory Work, Laboratory Write-ups, Projects, and Examinations.

4.0 Content

TOPICS	*COURSE CONTENT DETAILS*
1.	Semiconductor Devices
2.	Transistor Amplifiers (Signal and Power amplifiers)
3.	Operational amplifiers (Signal amplification and Signal Processing)
4.	Feedback and Oscillators
5.	Active Filters (High Pass, Low Pass, Band Pass, and Notch)
6.	Power supplies and Voltage Regulators
7.	Thyristor power Control
8.	Communications systems

5.0 Organisation and Teaching Methods

The contact hours in this course is 5 hours per week, consisting of:

Hr / Week	*Type*	*Weeks*
3 × 1	Lecture / Tutorial	1 - 14
1 × 2	Electronics Laboratory	1 - 14

A set of ten (10) compulsory electronics practicals are required to be completed during the relevant laboratory sessions. Formal write-ups are required of three (3) of these practicals. Within the laboratory sessions, the computer based application 'WinPSpice' will be introduced and utilised for circuit simulation and for design of laboratory circuits.

Relevant student self assessment Circuit Theory questions, from the computer based education package *'Circuit Tutor'*, will be required to be attempted over the semester period. A collection of the students result print-outs will be required to be submitted for assessment.

A semester long Design Project will be selected by the student. This involves the design of an electronic circuit to solve a task that arises in real life situations. The tasks are designed to be elementary enough such that the theory introduced within this course should provide sufficient background to complete the selected task.
A written report, and a 5 minute oral / visual presentation is required upon completion.

6.0 Assessment

6.1 Items

No.	*DESCRIPTION*	*WEIGHTING %*
1.	Laboratory Attendance / Log Book	10
2.	Laboratory Write-ups (3 × 5% each)	15
3.	Computer Based Circuit Theory Tutorial Questions	10

4. Design Project (5% Presentation & 10% Write-up) 15
5. 3 Hour end of semester restricted examination 50

6.2 Criteria

Attendance and participation in the laboratory classes is required in order to satisfactorily complete the course. Students are required to attend the scheduled laboratory sessions, or make arrangements to undertake laboratories at a later time.

Laboratory recordings are due at the commencement of the following scheduled laboratory class. Normally, no marks will be awarded for laboratory work (log book or write-ups) unless the student has attended the relevant laboratory session.

A satisfactory standard must be obtained in EACH item of the assessment to be eligible for a passing grade. Any laboratory report, or assignment, that receives a failing grade must be resubmit until a pass grade is obtained. The maximum grade for a re-submitted assessment item is a Pass.

The examination in this course is restricted. Apart from writing materials, only a calculator may be brought into the examination by the student.

6.3 Assessment Break Down

1: Laboratory Attendance and Log Book, 10%

Weekly laboratories must be recorded in a single bound laboratory work book, and be signed off at the end of the laboratory sessions. All initial designs, circuit diagrams, and wiring diagrams MUST be recorded within the laboratory work book.
No loose leaf laboratory work will be accepted.

2: Formal Write-ups. 3 write-ups are required, each worth 5%. 15%

No.1	Due: End of Lecture Week 4	Choice: Lab 1, 2, or 3.
No.2	Due: End of Lecture Week 8	Choice: Lab 4, 5, or 6.
No.3	Due: End of Lecture Week 12	Choice: Lab 7, 8, 9, or 10.

Marking criteria for these laboratories are given within the Laboratory Manual.

3: Self assessment questions from the computer based package 'Circuit Tutor'. 10%
The criteria for submission is provided in the Laboratory Manual.

4: Design Project, 15%

A quasi real life task will be selected, in which an electronic circuit will be required to be designed and tested to solve the problem.
A formal report is then required, as well as a 5 min presentation to the class.

Report: 10%, Due Week 12. Presentation: 5%, in Week 13.

The Marking criteria for these items are given within the Laboratory Manual.

5: End of Semester Examination - During the examination period. 50%

6.4 Assessment Rationale

The lectures will provide theoretical and practical understandings of the content areas.

The laboratory sessions, with a group size of approximately 15, will provide students with the opportunity to clarify their own ideas on the content material, to develop necessary problem solving skills, and to discuss their ideas. In addition they will assist students to develop competency in appropriate laboratory skills, and to interpret the results of these laboratory exercises.

The laboratory reports are to encourage the students to practice the skills of technical report writing and to bring together various topics covered in the lecture, tutorial and laboratory sessions.

The Design Project provides the student with practice in the development of circuits to resolve problems that could arise in real life situations. The exercises are also intended to show relevance to the theory taught within this course, by demonstrating some practical application of the theory.

The self assessment 'Circuit Tutor' questions, and the final closed book examination are to assess the student's knowledge and understanding of the basic topics covered in the course, and the ability to apply that understanding to the solution of practical problems.

7.0 Texts and Supporting Materials

7.1 Specified Texts

Hacker, Charles; *'2074ENG - Analog Electronic Lecture Notes'*, Semester 2, School of Engineering, Griffith University- Gold Coast, 2002.

7.2 Support Materials Required

Burks Oakley, *'Circuit Tutor'*, [Computer Program], Addison Wesley, 1992.

MicroSim Corp; *'Win PSpice'* (Student Edn)., [Computer Program], 1996.

7.3 Recommended Readings/References

Boylestad, R. 'Introductory Circuit Analysis', (5 th Edn), Merrill Publishing Company, 1997.

LaLond, D.E., and Ross, J.A 'Principles of Electronic Devices and Circuits', Delmar Publishers, 1994.

Boylestad, R. and Nashelsky, L., 'Electronic Devices and Circuit Theory', (4 th Edn), Prentice-Hall Publishers, 1987.

Millan, J. and Grabe, A., Microelectronics, (2nd Edition) McGraw.

Reis, R A. ,'Electronic project design and fabrication', Merrill/Macmillan, 1992.

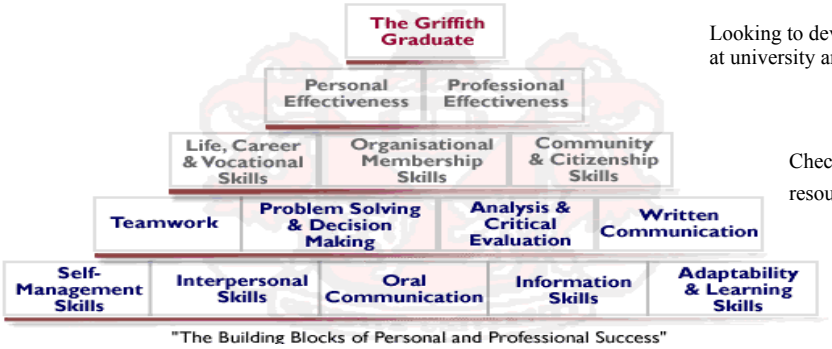
Manufacturers Data Books. (ie. National Semiconductor Linear Data Books)

8.0 Administration

Unless otherwise stated, the normal *Student Administration Policies and Rules* of the School of Engineering apply. See the School of Engineering Noticeboard for details.

The Griffith Graduate

Resource Directory for Generic Skills Development



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