

Course Description

1009 - Electrical and Electronic Engineering 1A

Course Code:	ELEC ENG 1009
Course Title	Electrical and Electronic Engineering 1A
Academic Year:	2008
Semester:	1 & 2
Units:	3
Lecturers Semester 1:	Dr. W.L. Soong (coordinator, electronics and machines components) Dr. B. Phillips (circuits and digital component) Mr. S. Ayton (digital component) Dr. M. Sorell (workshop component)
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Lecturers Semester 2:	Assoc. Prof. Mike Liebelt (coordinator, basic circuits and digital components) Dr. Peter Cooke (electronics and machines components)
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Aims:

This course provides an introduction to electrical and electronic engineering covering: basic electrical concepts, analogue and digital circuits, and electrical energy and machines.

Outcomes:

After successfully completing this course students will have an understanding of :

- basic electrical quantities and components
- key methods for analysing electric circuits
- the principles of simple electronic circuits including diode and amplifier circuits
- basic concepts of electric energy systems including energy generation and DC and AC machines
- the principles of digital electronics including microprocessors, binary arithmetic, and combinational and sequential digital circuits

Previous Studies:

A knowledge of mathematical techniques and physical and electrical phenomena such as can be obtained by studying SACE Stage 2 Mathematics and Physics will be assumed.

Further Studies:

This course introduces basic knowledge and skills that will be required in Electrical and Electronic Engineering 1B and also for many courses at higher levels that are concerned with electrical circuits and machines.

Delivery Methods:

This course will be presented as a series of approximately 32 lectures, with 6 tutorials and 12 three-hour workshops.

Assessment (provisional only):

The assessment will be based on

- Examination 2.5 hours : 60%
- On-line Tests and Homework : 10%
- Quiz : 10%
- Workshop performance: 20%

COURSE OUTLINE: 1009, ELECTRICAL AND ELECTRONIC ENGINEERING IA

32 lecture hours

33 practical hours (includes 3 hrs machines)

- A. Basic Circuits/DC Analysis (6 lect)** Electrical quantities, components and sources. Circuit analysis laws : Kirchhoff's voltage and current law, series/parallel resistors, voltage/current dividers, superposition, Thevenin and Norton. Controlled sources.
- B. Introduction to Electronics (6 lect)** Electrical devices (diodes, transistors) and applications. Diodes, DC power supplies, transistors and op-amps.
- C. Introduction to Electric Energy (8 lect)** Overview of electric energy, sustainability issues, and conventional and renewable power sources. Introduction to magnetic circuits, transformers, and DC and AC machines.
- D. Introduction to Digital Electronics (12 lect)** Overview of digital electronics and microprocessors. Introduction to binary arithmetic, Boolean algebra, combinational logic, flip-flops, and sequential logic.
- E. Application Lectures (1 or 2 lectures)** Primarily to explain how material in course can be applied in real problems (not examinable)
- F. Digital Workshop (33 hours)** Safety and basic skills. Electronic Die Design Project : power supply, oscillator, logic gates, flip-flops and counters. Workshop also includes three-hour electrical machine lab session.

Reference books

The course lecture notes should provide sufficient information for most students, however if you may find the following reference books useful if you are interested in learning more about any of the topics in this course.

A.R. Hambley: Electrical Engineering - Principles and Applications, 4th Edition, Pearson.

Gajski: "Principles of Digital Design" Prentice Hall.

Katz: "Contemporary Logic Design" 2nd edition. Prentice Hall.

Graduate Attributes

- GA1 An advanced level of knowledge and understanding of the theory and practice of Electrical and Electronic, Computer Systems, Telecommunications, Sustainable Energy, and Avionics and Electronic Systems Engineering and the fundamentals of science and mathematics that underpin these disciplines.
- GA2 A commitment to maintain an advanced level of knowledge throughout a lifetime of engineering practice and the skills to do so.
- GA3 The ability to apply knowledge in a systematic and creative fashion to the solution of practical problems.
- GA4 A commitment to the ethical practice of engineering and the ability to practice in a responsible manner that is sensitive to social, cultural, global, legal, professional and environmental issues.
- GA7 An ability to identify, formalise, model and analyse problems.
- GA8 The capacity to design, optimise, implement, test and evaluate solutions.
- GA10 Personal attributes including: perseverance in the face of difficulties; initiative in identifying problems or opportunities; resourcefulness in seeking solutions; and a capacity for critical thought.

These programs also foster the graduate attributes of the University of Adelaide and the Institution of Engineers Australia. These should be read in conjunction with the list above.

Assessment of Graduate Attributes

Attributes GA1, GA3, GA7 and GA8 will be assessed through the on-line tests, homework, quiz and examination. The experimental component of the course is designed to develop strong practical skills in the students and so will develop and assess the above attributes as well as GA10. The course also contains a component on sustainable energy which is assessed in the examination (GA4). Finally this course is an introductory electrical engineering course which forms the foundation for further studies in electrical engineering. Thus satisfactory completion of this course can be considered assessment of GA2.