

unit guie

The unit title: Electrical Principles

The unit reference number: DEN-2-16

The URL for the electronic version of the guide (if applicable)

The name of the school or faculty Faculty of Engineering, Science and the Built Environment

The academic year of presentation: 2002-05 S2

become what you want to be.

UNIT DEN_2_216:	ELECTRICAL PRINCI	PLES II
UNIT LEVEL:	2	
VALUE:	1	
STUDY TIME:	Class Contact: {Lectures/ Tutorials: Workshops / Tutorials: Self Study: Total:	36 hours 24 hours 12 hours} 114 hours 150 Hours:
PREREQUISITES	electrical Principles 1	
ASSESSMENT:	Formal Examination Assigned Work	80% 20%
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LECTURER(S): Dr. Maz Shirkoohi

Summary

This Unit Guide is an attempt to inform you how the teaching is structured so that you know the order and chronological presentation of topics. This should enable you to prepare for the lectures ahead. This preparation is essential if you are to benefit fully from the limited contact time.

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1. AIMS

The unit will extend the concepts and theory of electrical engineering to relevant fields of building services engineering.

2. OBJECTIVES / LEARNING OUTCOMES

The expected learning outcome after studying this unit is that the students will be able to:

- Analyse mathematically alternating current power circuits for use in engineering services design.
- Describe the application of electromagnetism in to industrial transformers and motors.
- Analyse the power requirements of a load and select a suitable form of power factor correction in relation to likely energy tariffs.
- Describe the theoretical performance of an induction motor and derive and analyse a simple mathematical model of its performance.
- Relate the theory of invertors and compare the operation of PAM and PWM invertors in trying to emulate sinusoidal waveforms.
- Analyse the performance criteria of modern semi-conductor devices and select suitable devices for a range of application.

3. SYLLABUS

The following is an indicative list of what is to be covered:

Revision of electrical fundamentals of voltage, current and impedance. calculations of ac circuits, phasor notation. Active, reactive and apparent components of current and power. Tariff structures and power factor correction

Ideal and real transformers with hysteresis, eddy currents, winding resistance, magnetising current, leakage reactance and their limitations, Simple equivalent circuits, transformer equation.

Operating principle of inverters, use and operation of Pulse Amplitude Modulation (PAM) and Pulse Width Modulation (PWN1) inverters variable frequency supplies for building loads and UPS systems.

Three-phase induction motors, squirrel cage and slip ring machines. Development of simple mathematical model for motor action and operating characteristics of motor on variable voltage and variable frequency supplies.

4. ORGANISATION OF UNIT

A weekly unit allowance of four hours is allowed comprising a two-hour lecture and a two-hour workshop/tutorial session.

You are expected to attend all sessions on time. Please note that you will not get any special help if you miss lectures or workshop sessions.

You should spend a minimum of eight to nine additional hours per week in private study to compliment your notes, to finish off your laboratory reports, solving tutorial questions, and revising.

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5. TEACHING AND LEARNING METHODS

Lecture and tutorial supplemented with printed notes on CD-Rom.

Please note that the sequence of some lectures, contents of syllabi and laboratory schedule outlined in this unit guide, may change, but notice will be given.

6. ASSESSMENT SCHEDULE

This unit will be assessed by a three-hour formal examination at the end of the semester as well as by the assigned work.

The non-contact hours should be used for assigned reading and preparation of material in relation to the laboratory work and / or other assigned work.

The assessment will be as follows:

(i)	Formal Examination (3-hour)	80 %
(ii)	Assigned Work	20 %

Pass mark for each component is 40%. An overall weighted average of 40% should also be achieved to pass the unit.

Please note that you must submit all assessed work on time and in accordance with the prevailing school procedures and regulations. Check with the school secretary if not sure. Failure to do so may result in disappointment on your part.

Late submissions will be penalised.

Submission of Coursework.

(i) You may be required to undertake coursework on a unit within your course, which is assessed by the course staff and for which your marks contribute towards the grade of your degree or diploma. It is in your interest to follow some simple rules:

- * Discuss any problems you may have in completing the coursework with your unit coordinator as soon as possible;
- * Make sure you know when the deadline date for submission is;
- * Get the agreement of your unit co-ordinator to an extension of the deadline date for submission;

Copies of all forms are available from your faculty office.

(ii) The deadline date for the submission of all coursework will be made available to you.
If it is not, you should ask your unit co-ordinator. Your unit co-ordinator may change the deadline date for the submission of coursework. He or she will tell you in good time.

(iii) Unless you have obtained the agreement of your unit co-ordinator to the late submission of your coursework, coursework submitted:

<u>Up to TWO weeks</u> after the deadline date will receive a maximum mark of the pass mark (40%) for undergraduate courses, 50% for postgraduate

courses);

* <u>More than two weeks</u> after the deadline date will not be marked.

(iv) If you want an extension of the deadline date, you must:

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ELECTRICAL PRINCIPLES II

- * Get a copy of the form for late submission from your faculty office;
 - Fill in Part A of the form, giving reasons why you cannot meet the existing deadline date;
- Ask your unit co-ordinator to fill in Part B the decision whether to agree the request rests with the unit co-ordinator;
- Attach the form to the front of your coursework when you submit it.

The maximum extension is two weeks.

(v) You must:

- Complete the coursework submission form and attach it to the front of your coursework;
- * If necessary, attach the form for an extension of the deadline date, signed by your unit co-ordinator, to the front of your coursework;
- Take the coursework to your Faculty Office, which will date stamp the submission form.

You must <u>not</u> hand coursework to your unit co-ordinator or other lecturer. The only exception in some Schools is for practicals marked in laboratories - you will be informed in such cases.

7. INDICATIVE BOOK LIST

Prentice

Hall

The recommended books for the unit are:

1).

Electrical Engineering: Principles and Applications, 2/e

Allan R. Hambley, Michigan Technological University

Copyright 2002, 864 pp. Cloth format ISBN 0-13-061070-4

2). Foundations of Electric Circuits, 1/e



J.R. Cogdell, University of Texas, Austin

Copyright 1999, 300 pp. Paper format ISBN 0-13-907742-1

3). Higher Electrical Engineering, J. Shephard, A.H. Morton and L.F. Spence. Published by Longman, 1999.

Additional recommended books:

4). Fundamentals of Electric Circuits, 4th edn., D.A. Bell. Published by Prentice-Hall, 1988.

5). An Introduction to Semiconductor Microtechnology, D.V. Morgan and K. Board. Published by Open University, 1985.

8. ASSESSMENT METHOD

The unit will be assessed based on a three-hour end of unit test, and the assessed laboratory logbook, with the marks split as follows:

a. O	ne 3-hour end-of-unit examination	30%
b. A	ssignment	20%

9a. End-of-unit examination (80%)

The end-of unit examination will be of three hours duration and usually have six questions in total, and you are asked to answer 4 questions. All questions carry equal marks.

9b. Laboratory write up / assignment submission (20%)

An assignment will be set during the course of the semester. You are required to adhere to the guidelines of the written format for the assignment, which require strict format for the technical write up, e.g. correct and consistent referencing and presentation. The topic of the assignment will be related to one or more of the subject areas detailed in the syllabus.

Maz Shirkoohi Sept. 2004