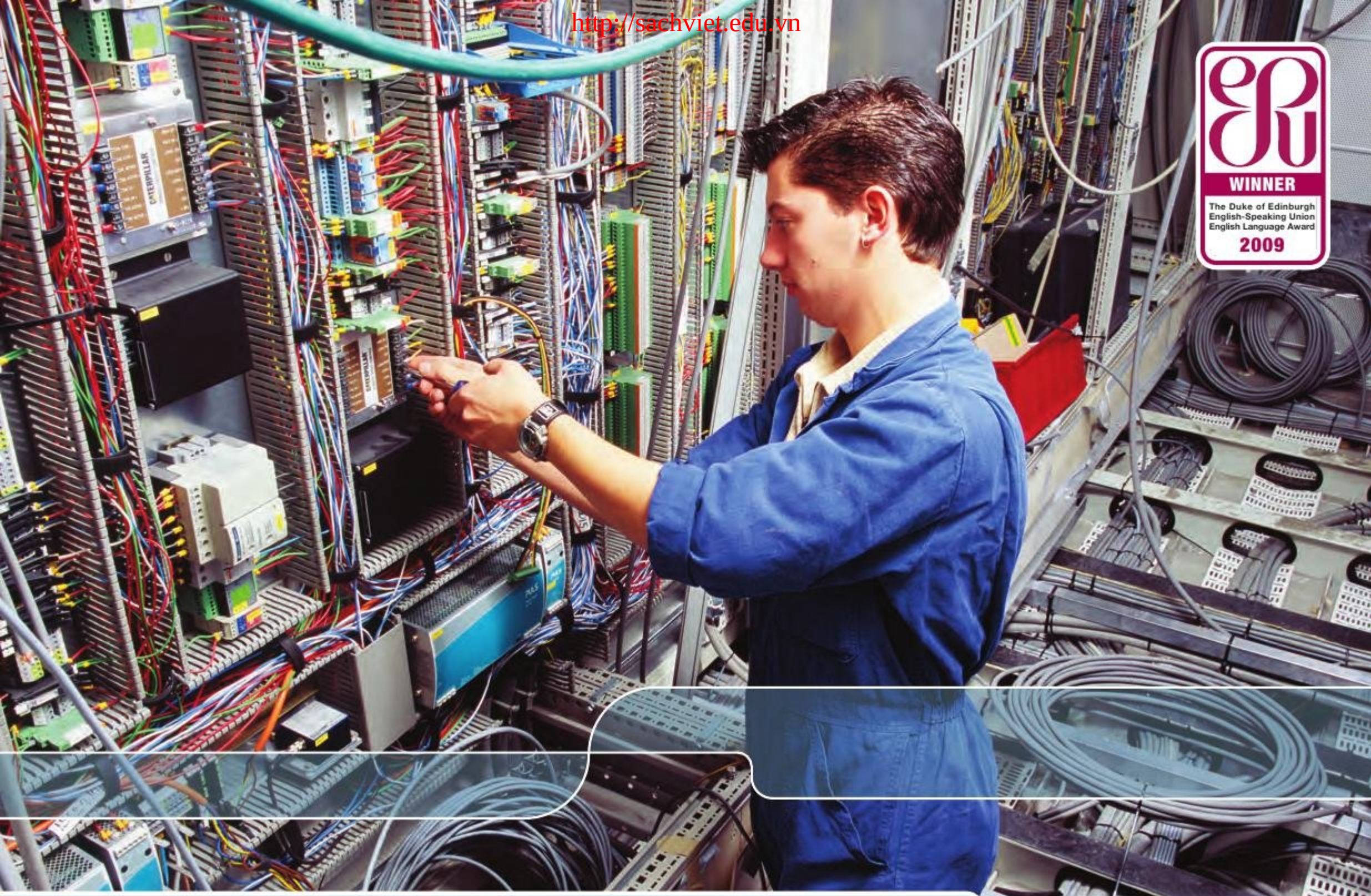

WINNER
The Duke of Edinburgh English-Speaking Union English Language Award
2009

Series Editor: Terry Phillips

Roger H. C. Smith

English for ELECTRICAL ENGINEERING

in Higher Education Studies

Course Book

esap
English for Specific Academic Purposes

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Published by
Garnet Publishing Ltd.
8 Southern Court
South Street
Reading RG1 4QS, UK

www.garneteducation.com

First published 2014.

ISBN 978 1 90757 532 7

British Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library.

Production
Series editor: Terry Phillips
Project management: Claire Forsyth, Matthew George
Editorial team: Stephen Brierly, Matthew George, Karen Kinnair-Pugh, Sue Coll
Specialist review: Liana Marmol, Oswaldo Cadenas
Design: Neil Collier, Mike Hinks, Henry Design Associates
Photography: shutterstock.com, alamy.com, sciencephoto.com, wikipedia.org
Illustration: Doug Nash

Audio recorded at Silver Street Studios.

Acknowledgments
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Printed and bound in Lebanon by International Press: interpress@int-press.com

Introduction

English for Electrical Engineering is designed for students who plan to take an Electrical Engineering course entirely or partly in English. The principal aim of *English for Electrical Engineering* is to teach students to cope with input texts, i.e., listening and reading, in the discipline. However, students will be expected to produce output texts in speech and writing throughout the course.

The syllabus focuses on key vocabulary for the discipline and on words and phrases commonly used in academic English. It covers key facts and concepts from the discipline, thereby giving students a flying start for when they meet the same points again in their faculty work. It also focuses on the skills that will enable students to get the most out of lectures and written texts. Finally, it presents the skills required to take part in seminars and tutorials and to produce essay assignments.

English for Electrical Engineering comprises:

- this student Course Book including audio transcripts and wordlist
- the Teacher's Book, which provides detailed guidance on each lesson, full answer keys, audio transcripts and extra photocopiable resources
- audio CDs with lecture and seminar excerpts

English for Electrical Engineering has 12 units, each of which is based on a different aspect of electrical engineering. Odd-numbered units are based on listening (lecture/seminar extracts). Even-numbered units are based on reading.

Each unit is divided into four lessons:

Lesson 1: vocabulary for the discipline; vocabulary skills such as word-building, use of affixes, use of synonyms for paraphrasing

Lesson 2: reading or listening text and skills development

Lesson 3: reading or listening skills extension. In addition, in later units, students are introduced to a writing assignment which is further developed in Lesson 4; in later listening units, students are introduced to a spoken language point (e.g., making an oral presentation at a seminar) which is further developed in Lesson 4

Lesson 4: a parallel listening or reading text to that presented in Lesson 2, in which students have to use their new skills (Lesson 3) to decode; in addition, written or spoken work is further practised

The last two pages of each unit, *Vocabulary bank* and *Skills bank*, are a useful summary of the unit content.

Each unit provides between four and six hours of classroom activity with the possibility of a further two to four hours on the suggested extra activities. The course will be suitable, therefore, as the core component of a faculty-specific pre-sessional or foundation course of between 50 and 80 hours.

It is assumed that prior to using this book students will already have completed a general EAP (English for Academic Purposes) course such as *Skills in English* (Garnet Publishing, up to the end at least of Level 3), and will have achieved an IELTS level of at least 5.

For a list of other titles in this series, see www.garneteducation.com

Book map

Unit	Topics	
1 What is electrical engineering? Listening · Speaking	• what is included in the subject of Electrical Engineering • different branches of electrical engineering: computing and electric power • different aspects of electrical engineering e.g., definitions of some basic electrical terms, measuring devices	
2 The history of electrical and electronic engineering Reading · Writing	• the history of electrical engineering from the 19th century to modern days • key figures in the discipline: their main achievements and inventions • the more recent history of electronic engineering: solid-state electronics	
3 Electric and magnetic circuits Listening · Speaking	• Ohm's law • the applications of Ohm's law to simple electric circuits • the limitations of Ohm's law for circuit elements that do not have a constant resistance • how Ohm's law can be applied to magnetic circuits	
4 The computer Reading · Writing	• the development of the computer • the invention of the integrated circuit, or microchip: its advantages and its impact on society • the use of computers in education • a guide to a more efficient use of the Internet and computers in research	
5 The television – from CRT to LCD and 3D Listening · Speaking	• small electrical items: the technology behind different types of television set and screen • some examples of television technology and devices • 3D televisions: two types of lens used in 3D technology: passive and active	
6 Control systems Reading · Writing	• control system design • a common feedback loop controller: *PID* • examples of control systems: setting the temperature of a domestic oven, cruise control for cars	
7 Electric power generation, transmission and distribution Listening · Speaking	• how electric power is generated in various kinds of power station, such as wind turbines • how it is transmitted across long distances • how it is delivered to customers • issues involved in the power transmission process: energy loss, voltage choices, transformers	
8 Telecommunications Reading · Writing	• the history of telecommunication: the main inventions and developments • the processes involved in telecommunication: key stages, elements and related devices • examples of the main applications of telecommunication: radio broadcasting, the mobile phone • the influence that telecommunication has had on the world	
9 Signal processing Listening · Speaking	• analogue and digital signal processing • different types of signal and how and why they are processed • filters and processors for both analogue and digital signals • applications of signal processing: active noise control and speech recognition technologies	
10 Electric cars Reading · Writing	• the reasons why electric cars have become popular, their advantages and disadvantages • the problems that electric cars pose for electrical engineers: the need to balance issues of efficiency, weight and environmental concerns	
11 Microelectromechanical systems Listening · Speaking	• MEMS and NEMS (micro- and nanoelectromechanical systems): how they are manufactured • applications: examples of devices using MEMS and NEMS • potential future developments	
12 Lighting engineering Reading · Writing	• the main lighting devices: incandescent light bulbs, fluorescent lamps and LEDs • how these devices work, their applications, and their advantages and disadvantages • technical report writing in the field of simple circuits with LEDs	

	Vocabulary focus	Skills focus		Unit
	• words from general English with a special meaning in electrical engineering • prefixes and suffixes	**Listening**	• preparing for a lecture • predicting lecture content from the introduction • understanding lecture organization • choosing an appropriate form of notes • making lecture notes	1
		Speaking	• speaking from notes	
	• English–English dictionaries: headwords · definitions · parts of speech · phonemes · stress markers · countable/uncountable · transitive/intransitive	**Reading**	• using research questions to focus on relevant information in a text • using topic sentences to get an overview of the text	2
		Writing	• writing topic sentences • summarizing a text	
	• stress patterns in multi-syllable words • prefixes	**Listening**	• preparing for a lecture • predicting lecture content • making lecture notes • using different information sources	3
		Speaking	• reporting research findings • formulating questions	
	• computer jargon • abbreviations and acronyms • discourse and stance markers • verb and noun suffixes	**Reading**	• identifying topic development within a paragraph • using the Internet effectively • evaluating Internet search results	4
		Writing	• reporting research findings	
	• word sets: synonyms, antonyms, etc. • the language of trends • common lecture language	**Listening**	• understanding 'signpost language' in lectures • using symbols and abbreviations in note-taking	5
		Speaking	• making effective contributions to a seminar	
	• synonyms, replacement subjects, etc. for sentence-level paraphrasing	**Reading**	• locating key information in complex sentences	6
		Writing	• reporting findings from other sources: paraphrasing • writing complex sentences	
	• compound nouns • fixed phrases from electrical engineering • fixed phrases from academic English • common lecture language	**Listening**	• understanding speaker emphasis	7
		Speaking	• asking for clarification • responding to queries and requests for clarification	
	• synonyms • nouns from verbs • definitions • common 'direction' verbs in essay titles (discuss, analyze, evaluate, etc.)	**Reading**	• understanding dependent clauses with passives	8
		Writing	• paraphrasing • expanding notes into complex sentences • recognizing different essay types/structures: descriptive · analytical · comparison/evaluation · argument • writing essay plans and writing essays	
	• fixed phrases from electrical engineering • fixed phrases from academic English	**Listening**	• using the Cornell note-taking system • recognizing digressions in lectures	9
		Speaking	• making effective contributions to a seminar • referring to other people's ideas in a seminar	
	• 'neutral' and 'marked' words • fixed phrases from electrical engineering • fixed phrases from academic English	**Reading**	• recognizing the writer's stance and level of confidence or tentativeness • inferring implicit ideas	10
		Writing	• writing situation–problem–solution–evaluation essays • using direct quotations • compiling a bibliography/reference list	
	• words/phrases used to link ideas (*moreover*, *as a result*, etc.) • stress patterns in noun phrases and compounds • fixed phrases from academic English • words/phrases related to research	**Listening**	• recognizing the speaker's stance • writing up notes in full	11
		Speaking	• building an argument in a seminar • agreeing/disagreeing	
	• verbs used to introduce ideas from other sources (*X contends/suggests/asserts that …*) • linking words/phrases conveying contrast (*whereas*), result (*consequently*), reasons (*due to*), etc. • words for quantities (*a significant minority*)	**Reading**	• understanding how ideas in a text are linked	12
		Writing	• deciding whether to use direct quotation or paraphrase • incorporating quotations • writing research reports • writing effective introductions/conclusions	

1 WHAT IS ELECTRICAL ENGINEERING?

1.1 Vocabulary

guessing words in context • prefixes and suffixes

A Read the text. The red words are probably familiar to you in general English. But can you think of a different meaning for each word in English for electrical engineering? Change the form if necessary.

One evening, I was feeling hungry so I crossed the field next to my house and went to a local restaurant. It's on a busy junction, so there was a lot of noise from the traffic. There was also a band playing inside so it was impossible to talk. I waved to a friend on the other side of the restaurant. The menu was written on a board above the bar, and I ordered my favourite dish. The waiter came loaded with plates, and when he reached my table they all fell to the ground and smashed! When the bill came, he charged me less because he wanted to apologize.

B Read these sentences from engineering texts. Complete each sentence with one of the red words from Exercise A. Change the form if necessary (e.g., change a noun into a verb).

1 Light is transmitted in the form of a _____.
2 I can receive a lot more television channels now I've installed a _____.
3 The electrical _____ is very weak.
4 This radio can receive a wide _____ of frequencies.
5 The electrical components are positioned on the printed circuit _____.
6 It is important that the wiring in a _____ box is not loose.
7 The original transmitted signal is distorted by a lot of _____.
8 We need a _____ connection to make this system safe.
9 The _____ on this circuit is too high – turn it off!
10 This electrode has a strong negative _____.

C Study the words in box a.

1 What is the connection between all the words?
2 What is the base word in each case?
3 What do we call the extra letters?
4 What is the meaning of each prefix?
5 Can you think of another word with each prefix?

a

electromagnet infrared kilowatt megawatt microwave overload thermoplastic transmission ultrasonic untuned

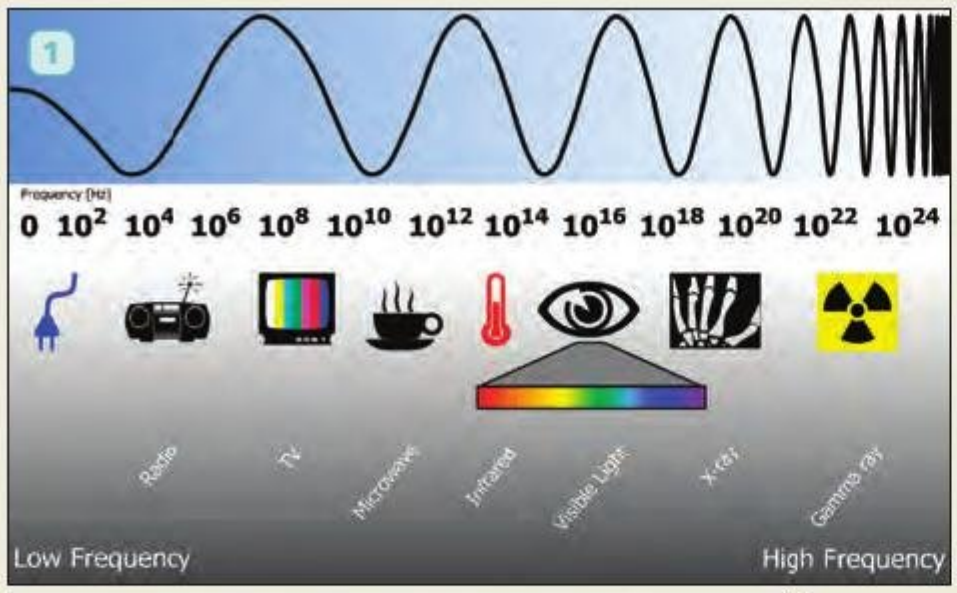
D Study the words in box b.

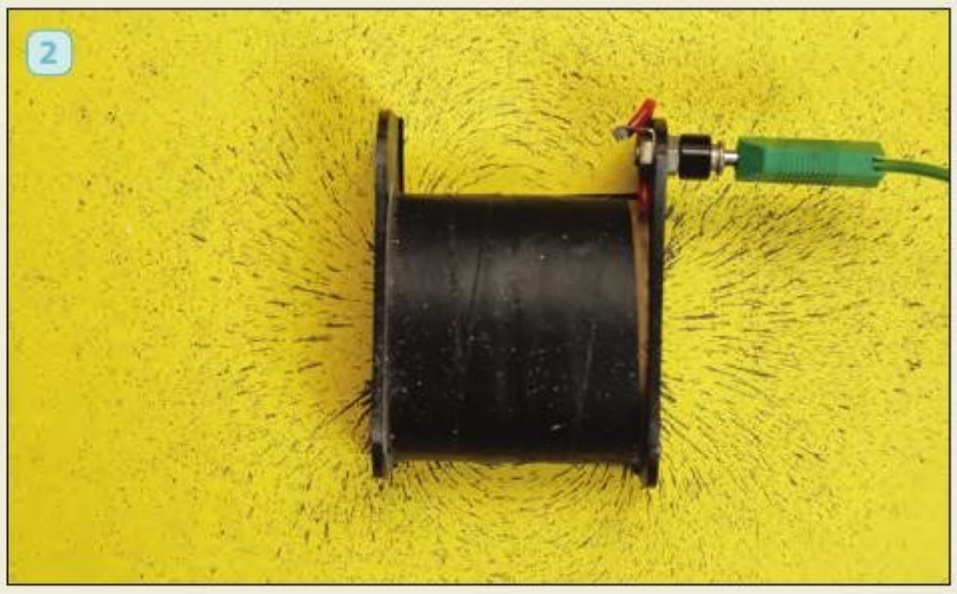
1 What is the connection between all the words?
2 What is the base word in each case?
3 What do we call the extra letters?
4 What effect do the extra letters have on the base word?
5 Can you think of another word with each suffix?

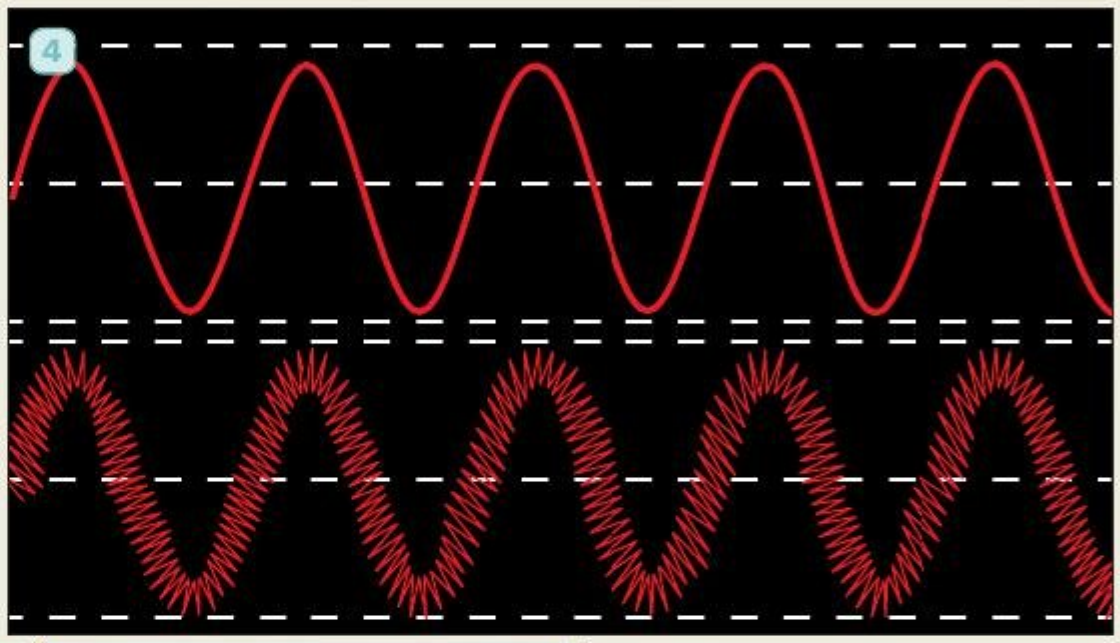
b

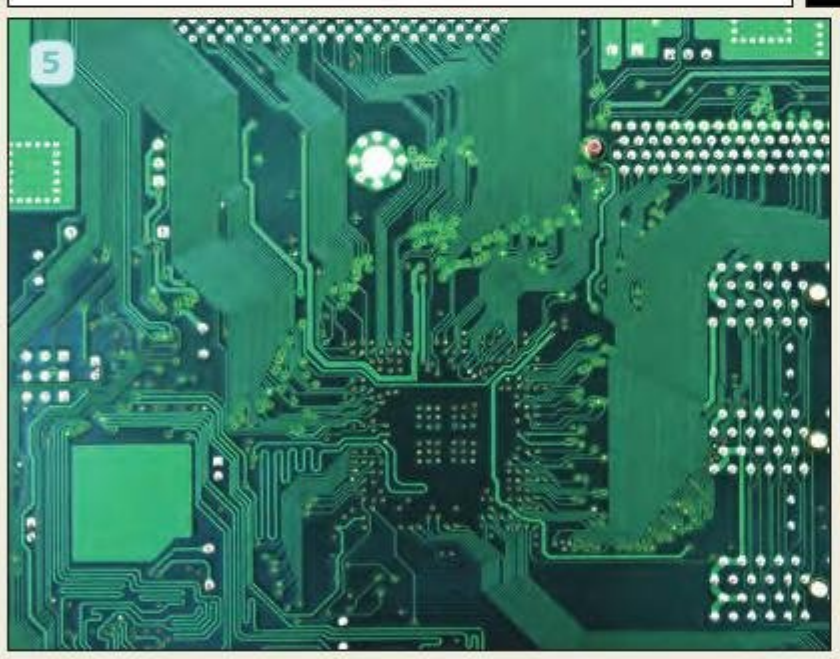
electricity inductance leakage magnetic ohmmeter radiation resistor thermal voltaic wiring

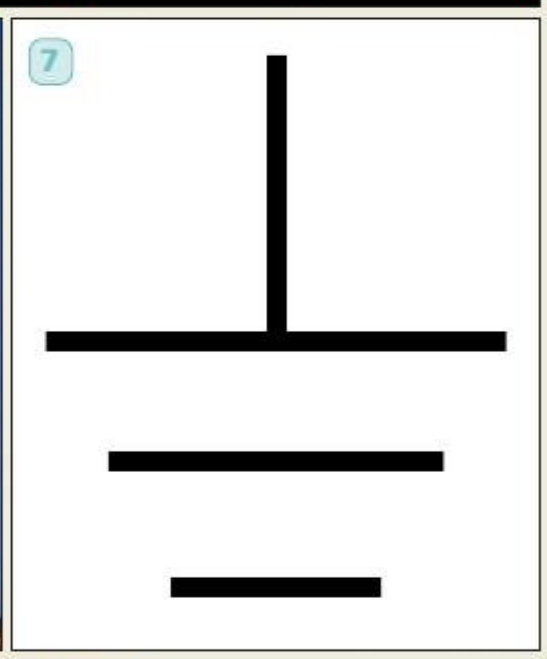
E Use words from this page to discuss the pictures on the opposite page.

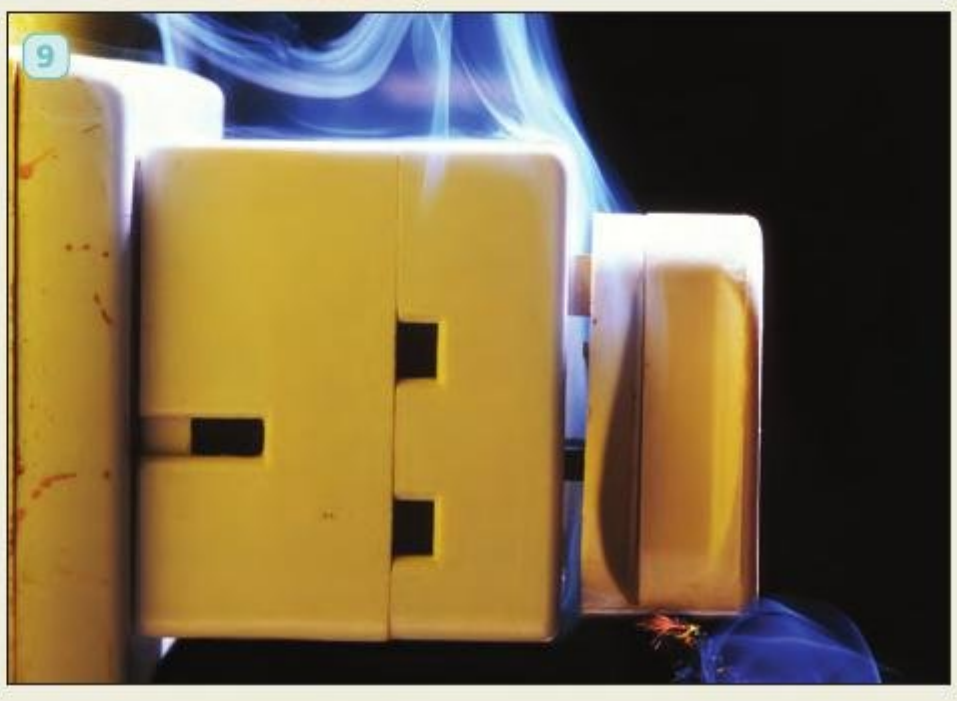












1.2 Listening

preparing for a lecture • predicting lecture content • making notes

A You are a student in the Electrical Engineering Faculty of Hadford University. The title of your first lecture is *What are the branches of Electrical Engineering?*

1 Think of the branches of Electrical Engineering that you know.

2 What other ideas will be in this lecture? Make some notes.
See *Skills bank*

B Listen to Part 1 of the talk. What does the lecturer say about the branches of Electrical Engineering? Tick the best choice.

1 There are only a few important branches of Electrical Engineering. ___

2 The branches are completely separate from each other. ___

3 Electronics is not part of Electrical Engineering. ___

4 Electrical Engineering has many branches covering a wide area. ___

C In Part 2 of the talk, the lecturer describes several important branches of Electrical Engineering and some applications and devices.

1 How many applications and devices do you know?

2 Listen and check your ideas.

3 What will the lecturer talk about next?

D In Part 3 of the talk, the lecturer talks about key *subjects* that electrical engineers need to know, specific *theories* they may use in their work, and typical *tasks* they do.

1 Which subjects, theories and tasks will be mentioned, do you think?

2 Listen and check your ideas.

E In the final part of the talk, the lecturer looks at the difference between Electrical Engineering and Electronic Engineering. Listen and mark each word in the box with A or B if it is connected with electrical engineering (A) or electronic engineering (B).

computers ___ integrated circuits ___
large-scale electrical systems ___ motor control ___
power transmission ___ small-scale electrical systems ___
transmit energy ___ transmit information ___

F Write a definition of:

1 *Electrical* Engineering (as used in Europe). Use words from Exercise E.

2 *Electronic* Engineering (as used in Europe). Use words from Exercise E.

G Look back at your notes from Exercise A. Did you predict:

- the main ideas?
- most of the special vocabulary?