

Book map

Unit	Topics
1 What is electrical engineering? Listening · Speaking	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• control system design• a common feedback loop controller: <i>PID</i>• examples of control systems: setting the temperature of a domestic oven, cruise control for cars
7 Electric power generation, transmission and distribution Listening · Speaking	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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