



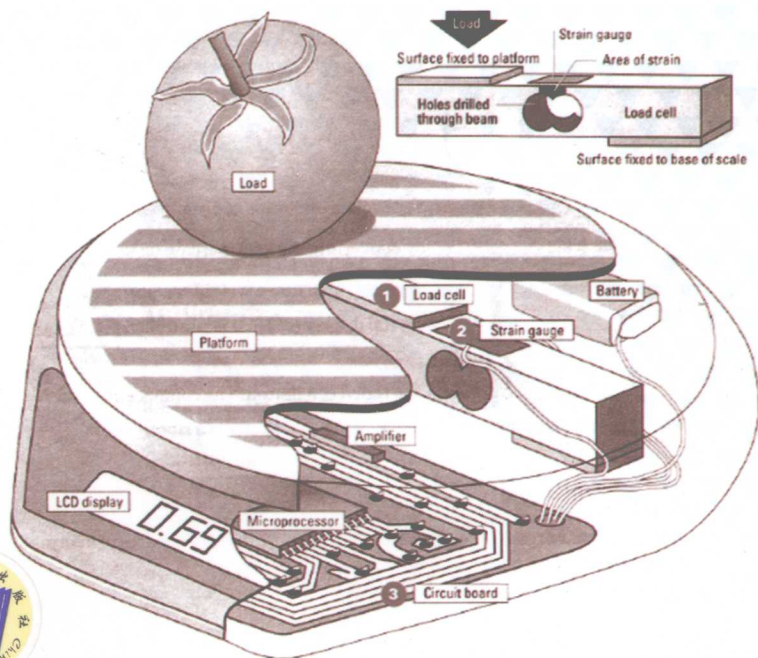
北京市高等教育精品教材立项项目

普通高等教育机电类专业规划教材

机械电气 专业英语

*Mechanical and
Electrical Engineering English*

刘瑛 王侃 张从鹏 编



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机械工业出版社

本书为北京市精品立项教材，是一部以提高学习者专业英语应用水平为目标的，具有很强参与性与趣味性的机械与电气专业英语教材。

本书从工程的概念开始，内容涵盖简单机械、工程材料、工程力学、简单电路、健康和安全、工程制图、加工中心、电动机、注塑成型、电冰箱、中央供暖系统、腐蚀、应变仪、汽车发动机、液压和气压系统、机器人技术等知识，最后还介绍了该行业的职业类型以及如何求职等实用性非常强的内容。此外，还提供了5课专供学生表演的风趣幽默的戏剧脚本，脚本内容也均与专业密切相关。本书提供的练习非常注重调动学生的积极性，使学生在课堂上脑、耳、眼、口并用，达到最佳学习效果。随书附有相关音频资料、课后习题参考答案、补充阅读材料及书中所有图稿，以便教师教学和学生自学。

本书为高等院校机械、电气等专业的专业英语教材，也可以作为工程技术人员自学参考用书。

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Preface

图书市场上机电专业英语类的图书并不少见，然而教学效果往往不尽如人意。究其原因，在于教材基本都停留在较为陈旧的模式上：大篇的科技文章后面跟着生词表以及难句翻译和注释。教师拿到这种教材，往往只好逐句讲解，平铺直叙，没有重点，学生在课堂中的参与程度很低，兴趣难以被激发，其英语应用水平也难以得到比较大的提升。

以前人们常说，好教师就是一个好演员，学生就是观众，这种看法体现了以教师为中心的教学理念。而本教材的设计，将教师转换到了导演的位置上，而学生成了真正的演员。教师可通过各种形式，激发学生的积极性，让他们在大量的互动与参与中提高英语应用水平。这种变化，体现在精心设计的内容上。比如在口语实战（Speaking practice）练习中，会刻意制造一些信息障碍，从而激发学生交流的欲望——成对练习的 A 和 B 两名学生分别看不同的凸轮结构图，并用英语向同伴描述该凸轮的结构组成、运动类型、工作原理等，同伴再根据其描述用图的形式将该机构表现出来。这种目的性很强的练习会极大地激发学生的能动性，课堂将变得十分活跃。此外，本教材中还有 5 课设计为风趣幽默的情景剧形式，而内容均与专业相关，教师可以组织学生在课堂上进行表演，相信同学们对专业英语的兴趣和应用能力都会在开心的笑声中得到提升。

本书涵盖 30 个单元，下面对每个单元的具体构成以及这 30 个单元的内容安排脉络给予说明，让读者对本书有一个较为清晰和全面的了解。

本书单元构成

本书各单元的结构基本相同，主要由以下 5 大部分内容组成。

1. 引入 (Tuning in)

这部分是学习本单元内容前的热身，通常会提出一些问题，学生可以分组讨论，在这个过程中探讨关于这个话题的知识和语言。同时，帮助读者发现自己不明白的知识点以及表达该话题所需的语言和词汇，这样对下面的学习会更有目的性。

2. 课文 (Text)

几乎每单元都安排有课文部分，但与传统专业英语教材的不同之处在于，本教材中课文篇幅要短小得多，而且附有大量生动明了的图表。阅读篇的主要目的在于帮助大家掌握各种阅读技巧。这部分内容的教学方式是教师讲解加学生实践。

3. 语言学习 (Language study)

学习这部分内容的目的在于提高语言的精确性。重点放在语言的结构、功能等方面（比如，如何描述事物的构成，如何对事物下定义，如何描述定理和规律，如何描述原

因和结果等)。例子通常从前面的课文提炼出来,先作一些必要的讲解,然后给出练习,让学生在练习中掌握该语言点。

4. 口语实战 (Speaking practice)

学习这部分内容的目的在于培养学生实际的交流能力和语言的流利性,而不刻意追求其语言的准确性。口语实战通常分为两个类型:一是故意制造信息障碍,如分别让甲乙两个同学看两个完全不同的图案,然后让他们用英语沟通了解彼此的意图。在这个过程中,必然会碰到彼此难以理解的情况,因此他们就必须想方设法要求对方澄清意图或自己改善表达方式;另一种类型是看图说话,比如给出电冰箱的原理图,让学生边看图边复述其工作原理。为了能清楚表达自己的意思,学生会主动在阅读资料中寻找必要的词汇和句式,这种自主学习模式效果要比老师逐句讲解好得多。大量的口语实战会让学生客观评价自己的英语交流能力,逐渐摒弃学英语就是为了应付考试的思想。

5. 写作 (Writing)

帮助学生用英文来表达自己的专业思想是设计这部分的主要目的。同时,写作也是巩固语言学习的重要途径。书中会安排一些实用的写作练习,如描述系统工作原理、写与工作相关的信件以及简历等。

以上部分并非在每课中都会出现,编者会根据各单元的内容特点,选择安排不同的学习形式。

本书内容安排脉络

本书的内容和难度设置遵循由浅入深的原则。从语言的角度讲,从事物的构成、比较等简单内容逐渐发展到因果、过程描述等相对复杂的语言表述;从工程的角度讲,文章从工程的概念、常见的工程材料入手,逐渐发展到较为复杂的机器人描述等内容。

书中 30 个单元大致可以分为 3 大部分;

前半部分介绍的语言现象,学生大都已经学过,训练的重点在于将学过的英语知识在专业上用起来,培养基本的听说读写能力,帮助学生逐渐适应这种以实战为主的学习模式。这部分以英美大学低年级机械电气专业学习大纲为根据收集相关资料并组织内容。

后半部分引入了较为复杂的语言现象,如因果关系的表达、过程的描述等等。这部分以英美大学中高年级机械电气专业学习大纲为根据收集相关资料并组织内容。

此外,第 5、10、15、20 和 25 单元属于戏剧表演,其内容都非常风趣幽默,语言地道而简洁。将这类单元穿插在整本书中,不但可以调节学习的节奏,还能增强学习的趣味性。在内容上,它们往往也和其前几单元的内容有很高的相关度。比如第 3、4 单元讲的都是简单机构,第 5 单元 The door 则是一个安装门的滑稽故事;又如第 8、9 单元内容都与电路相关,第 10 单元 The switch 则讲述了一次给新房布电线的难忘经历。这种安排能去除学生对专业术语的畏惧心理,让他们在戏剧表演中深刻地体会到,用英语表达专业知识其实并不难。

给教师的建议

本书编者推荐的学时为 48 个，一般每单元需要两个课时。本书之所以提供 30 个单元，主要是为了让教师根据自己的工程背景以及所在学校的特色选择最适合的单元进行教学。另外，每个单元的知识学习都是融汇在各种练习中的，为了避免满堂灌的教学弊端，教师一定要在课堂上给学生留出讨论、练习的时间，两个课时内不能完成的部分，可留做课后作业。

另外，随书附有相关音频资料、课后习题参考答案、补充阅读材料及书中所有图稿，从而方便老师的教学以及学生的自学。需要者请向本书的责任编辑索取。

本书由北方工业大学的刘瑛、王侃和张从鹏编写。其中，王侃老师负责编写 Unit 3 到 Unit 7，张从鹏负责编写 Unit 15 到 Unit 19，其他 Unit 由刘瑛老师完成。在编书过程中，研究生朱珊珊、李凯、王晓涛和廖学梅等同学完成了课文翻译、书后附录以及课后习题参考答案的制作，张财政和曾献标同学为收集和处理书中图片做了大量工作，在此表示感谢。

希望本书对相关专业师生有所帮助，不足之处欢迎指正 (liuying@ncut.edu.cn)。

编者

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What Is Engineering?

Tuning in

Task 1 Work in teams. Discuss the following questions in your group and then share your answers with other groups.

- (1) Do you know the name of your college and your department?
- (2) Are there other colleges of Engineering in your university? What are they?

Text

Do you want to change the world? Think engineering!

It's everywhere, shaping our world for the better. Designing “green” buildings or creating clean water systems for developing countries, engineers improve our quality of life through the practical use of science and math. Engineering is not science. Science is about discovering the natural. Engineering is creating the artificial. Scientists discover the world that exists; engineers create the world that never was.

Engineering is a broad discipline which is often broken down into several sub-disciplines. These disciplines concern themselves with differing areas of engineering work. Although initially an engineer will be trained in a specific discipline, throughout an engineer's career the engineer may become multi-disciplined, having worked in several of the outlined areas. Historically the main branches of engineering are categorized as follows:

Aerospace Engineering—The design of aircraft, spacecraft and related topics.

Chemical Engineering—The conversion of raw materials into usable commodities.

Civil Engineering—It is concerned with making bridges, roads, airports, etc.

Electrical Engineering—It is about the generation and distribution of electricity and its many applications. It includes electricity generating, electrical installation, lighting, etc.

Mechanical Engineering—It deals with the design and manufacture of tools and machines.

With the rapid advancement of technology many new fields are gaining prominence and new branches are developing such as Computer Engineering, Software Engineering, Nanotechnology, Molecular Engineering, Mechatronics, etc. These new specialties

sometimes combine with the traditional fields and form new branches such as Mechanical Engineering and Mechatronics, Electrical and Computer Engineering.

For each of these fields there exists considerable overlap, especially in the areas of the application of sciences to their disciplines such as physics, chemistry and mathematics.

Task.2 Read the text and then study the illustrations. They show some of the areas in which engineers work. Can you identify them? What kinds of engineers are concerned with these areas?

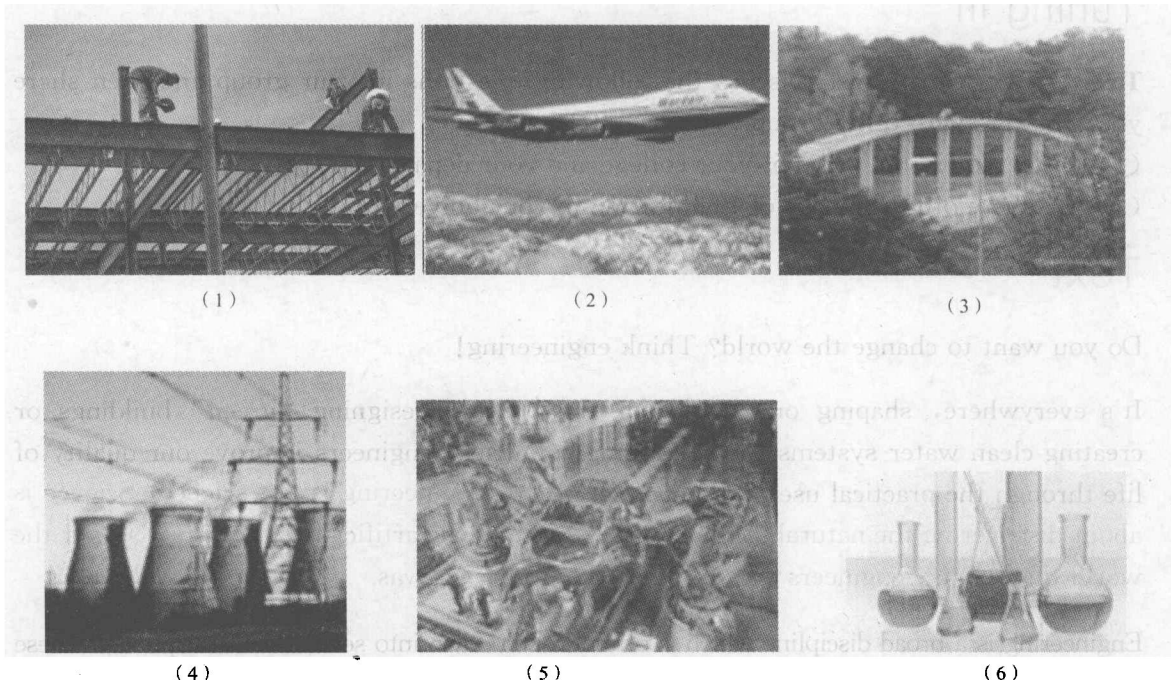


Figure 1-1 Branches of engineering

Language study

What is the link between column A and column B?

A	B
mechanical	machine
electrical	electricity

Column A lists a branch of engineering or a type of engineer. Column B lists things they are concerned with. We can show the link between them in a number of ways.

Mechanical engineering deals with machines.

Mechanical engineers deal with machines.

Mechanical engineering is concerned with machines.

Mechanical engineers are concerned with machines

Machines are the concern of mechanical engineers.

Task 3 Do the language study first and then match each item in column A with an appropriate item from column B and link the two in a sentence.

The first one has been done for you like this;

1 → f

Marine engineering deals with ships. Or

Marine engineers deal with ships. Or

Marine engineering is concerned with ships. Or

Marine engineers are concerned with ships. Or

Ships are the concern of marine engineers.

...

A	B
1. marine	a. air-conditioning
2. aeronautical	b. roads and bridges
3. heating and ventilating	c. body scanners
4. electricity generating	d. cables and switchgear
5. automobile	e. communications and equipment
6. civil	f. ships
7. electronic	g. planes
8. electrical installation	h. cars and trucks
9. medical	i. power station

Speaking practice

Task 4 Work in pairs, A and B. There are some short extracts—some engineers talk about their own jobs. Student A reads the first three extracts (don't peek at the last three extracts) for student B. Student B tries to answer: To which branch of engineering do these engineers belong? Which words help you decide on your answers?

Then student B reads the last three extracts for student A and student A tries to answer the same questions.

Note: If you don't understand what your partner says, these questions and phrases may be helpful.

(1) I'm sorry. I don't understand. Could you say that again, please?

(2) What do you mean by XXX?

(3) Pardon, please.

If your partner does not understand you, try to rephrase what you say in another way.

The possible engineering branches are:

Mechanical engineering—Marine engineering

Aerospace engineering

Electrical engineering—electricity generating

Mechatronics—Medical engineering

Mechanical engineering—heating and ventilation

Electrical engineering—electrical installation.

For student A:

See Appendix I Student A Speaking Practice Unit 1-

For student B:

See Appendix I Student B Speaking Practice Unit 1



Choosing a Course

Tuning in

Task 1 Study this list of points to consider when deciding whether to study engineering. Tick the statements which refer to you. Then ask your partner which statements refer to him or her.

- (1) Interested in how and why things work.
- (2) Constantly gather facts about their environment and store them away.
- (3) Usually able to master theory and abstract thinking, but don't particularly like dealing with it unless they see a practical application.
- (4) Focused on living in the present, rather than the future.
- (5) Love variety and new experiences.
- (6) Highly practical and realistic.
- (7) Excellent "trouble-shooters".
- (8) Usually laid-back and easy-going with people.
- (9) Independent and determined.
- (10) Usually quite self-confident.

If you have ticked most of these statements, engineering is the right course of study for you.

Text

Degrees in mechanical engineering are offered at universities worldwide. In China, India, and North America, mechanical engineering programs typically take four to five years and result in a Bachelor of Science (BSc), Bachelor of Technology (BTech), Bachelor of Engineering (B. Eng), or Bachelor of Applied Science (B. A. Sc.) degree, in or with emphasis in mechanical engineering. In Spain, Portugal and most of South America, where neither BSc nor BTech programs have been adopted, the formal name for the degree is "Mechanical Engineer", and the course work is based on five or six years of training.

In the U. S. , most undergraduate mechanical engineering programs are accredited by the Accreditation Board for Engineering and Technology (ABET) to ensure similar course

requirements and standards among universities. Mechanical engineering programs in Canada are accredited by the Canadian Engineering Accreditation Board (CEAB), and most other countries offering engineering degrees have similar accreditation societies.

Some mechanical engineers go on to pursue a postgraduate degree such as a Master of Engineering, Master of Science, Master of Engineering Management (MEng, Mgt or MEM), a Doctor of Philosophy in engineering (EngD, PhD) or an engineer's degree. The master's and engineer's degrees may or may not include research. The Doctor of Philosophy includes a significant research component and is often viewed as the entry point to academia.

Task 2 Read the text and see if you can explain the meaning of the important abbreviations in the area of high education.

- (1) B. Eng
- (2) BSc
- (3) B. A. Sc
- (4) BTech
- (5) ABET
- (6) CEAB
- (7) MSc
- (8) MEM
- (9) PhD

Word study

Task 3 Fill in the gaps in this text and compare your answers with your partner. More than one answer is possible for many of the gaps. You may use the following words.

completion qualification obtain enrol award internationa further

This unique, full-time course was developed by the University of Central Lancashire (UCLan) in collaboration with North China University of Technology (NCUT), as a direct result of the perceived need for professional engineers, in the Computer Aided Engineering specialism, with mixed international experience in the Far East region. The course suits students based in China and the Far East, who wish to _____ a British degree qualification in Computer Aided Engineering but who wish to study in England for only one year.

The course is innovatory and unique in that students will be _____ with both the University of Central Lancashire and North China University of Technology and on successful completion of the joint course they will be _____ a _____ of Engineering degree in Computer Aided Engineering (with Honours) from the University of Central

Lancashire and the equivalent Chinese Bachelors degree from North China University of Technology.

The course consists of 4 years of study. Students will study for three years at NCUT in Beijing, China. On successful _____ of the first three years at NCUT, students complete the course by joining the British students on the final year of the BEng (with Honours) in Computer Aided Engineering at UCLan in Preston, England.

Advantages of studying for a degree on a course of this type are that: students gain dual qualifications; they are close to home for 3 of the 4 years and the total fees and living costs are much lower than if the whole of the 4 years were spent in England.

Furthermore, the course aims to provide students with mixed _____ experience. The experience of living and studying in China and England will be valuable for those students who may work with Chinese and international organizations in the future. The Department of Technology also has opportunities for _____ study to MSc (taught course) and for research to MSc, MPhil and PhD. There are also postgraduate opportunities in other departments at UCLan.

Task 4 Read the text in Task 2 again and answer the following questions.

- (1) What kind of students does this course suit?
- (2) What will students get on successful completion of the joint course?
- (3) Where will students study during the four years?
- (4) What are the advantages of studying for a degree on the joint course?
- (5) What might students do after they get the dual qualifications?

Speaking practice

Task 5 Read the text first and then ask your partner some questions about the text like a reporter.

Note: You don't have to learn the above text by your heart. Just try to ask and answer the questions by your own words. You may ask the following questions if you like.

- (1) What's like to be an engineering student?
- (2) Do engineers make a big salary?
- (3) What else can you do with an engineering degree?
- (4) Is Engineering boring?
- (5) Do you think Engineering is your right choice? Why or why not?

Is Engineering My Right Choice?

Most undergraduate engineering programs are four years in USA. Some students get an associate's degree from a two-year program first, then go on to do another two years at a

four-year program to earn a bachelor's degree. In a typical four-year program, courses in the first two years are a mix of math and science, English, social sciences, the humanities, and introductory engineering. This is a great time to explore engineering as a whole and find out what really interests you. In your last two years, you'll investigate the engineering specialty of your choice. Practical work experience through internships and co-ops is also an integral part of many engineering programs.

Engineers not only earn lots of respect, but they're highly paid. Even the starting salary for an entry-level job is impressive!

An engineering degree offers you lots of freedom in finding your dream job. It can be a launching pad for jobs in business, design, medicine, law, and government. To employers or graduate schools, an engineering degree reflects a well-educated individual who has been taught ways of analyzing and solving problems that can lead to success in all kinds of fields.

Creative problem solving will take you into uncharted territory, and the ideas of your colleagues will expose you to different ways of thinking. Be prepared to be fascinated and to have your talents stretched in ways you never expected.

Reading **Having a purpose**

As a student of engineering or as a professional engineer, you have to read a great deal. It is important that you develop the most effective skills for getting the information you want quickly and accurately when you read.

Task 6 Choosing a course requires careful reading of college and university brochures. Your purpose here is to find the most appropriate course for each of the following prospective students. Use the course guide which follows and answer using the course code. Please work in teams so that each of you only has to find right courses for 2 or 3 students.

- (1) A student who has just left school and wants to become a technician.
- (2) A student who wants to design ships.
- (3) A student who wants to get an engineering degree and also improve his knowledge of languages.
- (4) A student who wants a degree eventually but whose qualifications at present are enough to start an HND(High National Diploma) course.
- (5) A student who wants to work as an engineer with the air force.
- (6) A technician employed by a company which installs electrical wiring in factories.
- (7) A student with a National Certificate in Electrical Engineering who is prepared to spend another two-year studying to improve her qualifications.
- (8) A student interested in how micro-organisms can be used in industry.

Course guide

Engineering

- EE22 Higher National Diploma in Electronic and Electrical Engineering. Two years, full-time. For potential electronic and electrical engineers. The first year is common and the second year allows students to specialize in whether electronic or electrical engineering subjects. Successful students may continue a degree course.
- EE17 National Certificate in Electrical Engineering. One year, full-time. For potential technicians or for those who wish to gain entry to an HND course.
- EE3 Higher National Certificate Course in Electronic and Electrical Engineering. Two years, day-release. This course provides the technical education required for senior technicians employed in the electrical installation industry.
- H300 Bachelor of Engineering (B Eng)—Mechanical Engineering for Europe. Four years, full-time, including one year study and work attachment in France or Germany.
- H400 Bachelor of Engineering (B Eng)—Aeronautical Engineering. Three years, full-time, or four years including one year of professional training in the aircraft industry.
- HJ36 Bachelor of Engineering (B Eng)—Naval Architecture and Ocean Engineering. Three years, full-time.
- H340 Bachelor of Science (Engineering)—Mechanical Engineering.
- H250 Bachelor of Engineering (B Eng)—Manufacturing Management. A two-year HND course in engineering followed by two-years of technology and management designed to produce managers qualified in high technology.

Writing Letter writing: requesting information

Task 7 Which modules listed above are you interested in? Please write an email to the information center of the university to get further information of the modules which interest you.

You may start you email like this:

Dear Sir/Madam

And end it like this:

Yours faithfully,

Daniel Smith