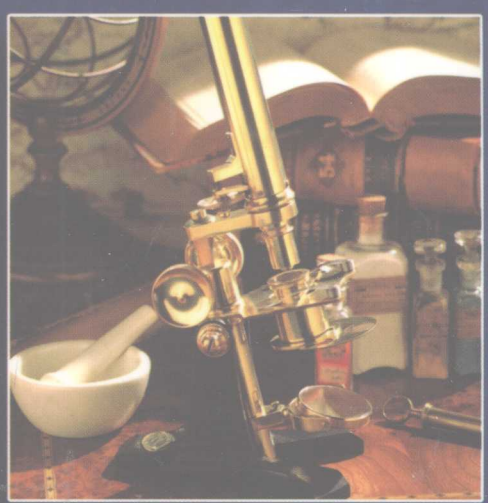
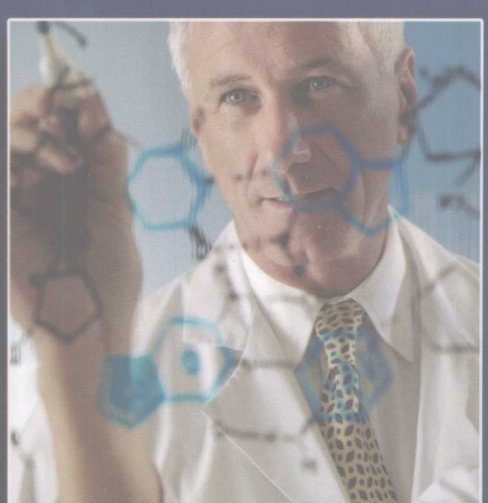
Professional English
职场英语选修教程系列

附光盘
Student Book
学生用书

English for Science and Engineering

理工职场英语





上海外语教育出版社
外教社 SHANGHAI FOREIGN LANGUAGE EDUCATION PRESS

CENGAGE Learning™

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Ivor Williams

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出 版 前 言

教育部最新颁布的《大学英语课程教学要求》提出："大学英语的教学目标是培养学生的英语综合应用能力，特别是听说能力，使他们在今后学习、工作和社会交往中能用英语有效地进行交际。"大学生要在今后学习、工作和社会交往中能用英语有效地进行交际，除了掌握听、说、读、写等基本英语语言技能外，很有必要学习相关的专业英语知识。经过广泛的市场调研及分析，我社与圣智学习出版公司合作出版了这套"职场英语选修教程系列"（***Professional English***），以满足大学生的实际需求。

与仅注重阅读和专业词汇的传统专业英语教材不同，该系列教程将专业知识融入真实的职场情景中，旨在培养职场英语交际能力，使大学生在未来的英语职场中能脱颖而出。整个系列包括四种教程：《成功职场英语》（***English for Professional Success***），《商务职场英语》（***English for Business***），《人文职场英语》（***English for the Humanities***）和《理工职场英语》（***English for Science and Engineering***）。其中，《成功职场英语》包括申请工作、写简历、组织会议、演示等普通职场话题及申请国外硕士课程等继续深造方面的话题，适合各专业学生学习使用；其他各教程则以商务、人文、理工等专业的话题为主线进行编写，适合相关专业学生学习使用。

各教程均由5个单元组成，每单元6课，各单元围绕一个主题展开，每个单元后有一个Team Project。所选内容为真实职场环境中的交际话题，可以激发学生的学习兴趣，提高学习积极性。训练形式多样化，旨在培养听、说、读、写技能，促使学生掌握职场环境中的种种英语交际能力。书后为每个单元配备了复习题、附加活动、阅读材料、写作材料和单元测试，丰富了学习内容。此外，还提供了语法要点、专业词汇表，方便学生查阅。

各教程均配有教师用书。

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To the Student

English for Science and Engineering is especially designed for university students at the intermediate level who want to use their English for international communication in professional contexts.

Objective

The purpose of this book is to empower students with the language and life skills they need to carry out their career goals. To this end, it provides ample opportunities for students to build awareness and practice the language in real-life scenarios. Its integrated skills approach develops students' self-confidence to survive and succeed in professional and social encounters within an English-speaking global community.

Content

The book has been designed with a core of 30 lessons plus additional resource sections.

The four skills of listening, speaking, writing, and reading are developed throughout each unit within professional contexts. Emphasis is on developing the life skills students need to deal with situations that they will encounter in the job market.

University students, regardless of their major, will immediately be motivated by the opportunity to prepare for the job market as they practice their English language skills in the following scenarios.

R&D

measuring and comparing R&D activities, putting together an R&D project team, planning an R&D project, developing new products

Design and Testing

resolving design issues, value engineering a product, designing tests, conducting performance tests

Manufacturing and Industry

describing technical processes, analyzing areas of expertise, describing habitual routines and current activities

Quality Control, Safety, and Maintenance

describing maintenance procedures, applying safety measures, running quality control checks

Careers and Management

assessing the job market, getting licensed, building a career

Using the book

Each content-based unit is divided into six two-page lessons. Each lesson is designed to present, develop and practice job-related skills. (See **Contents**.)

Vocabulary

A section with additional content vocabulary for the Science and Engineering is included for reference.

Grammar

There is no direct grammar instruction in the core lessons. However a complete grammar resource has been provided at the end of the book. The grammar resource can serve as a reinforcement of students' grammar skills. It can be used for self-study or independent practice.

The language elements are ordered as they appear in the units. But they may be referred to in any order. Each grammar presentation provides a grammar box or paradigm followed by contextual examples and a practice exercise.

Listening

Many of the workplace scenarios are presented and/or established through the listening contexts. An audio CD has been provided for students to allow for independent listening practice.

Ongoing Assessment

The five team projects found at the end of every unit, as well as the one-page unit reviews at the end of the book provide ample opportunity for ongoing assessment. Unit tests are also provided in the Student Book.

Other additional materials — addtional activities, reading resources, writing resources, unit tests — are also provided at the end of the book.

Contents

Unit 1

Research and Development

Unit 1

Lesson 1

Congress and the National Science Foundation

a In pairs or small groups, discuss the questions.

1. In your country, which government department has responsibility for scientific research?
2. Which universities in your country have a strong reputation for scientific research?

b Read and complete the text using the words below.

universities	governments	industries	foundations

Funding for Scientific Research

Scientific research requires substantial funding, especially when it involves the use of expensive equipment. This funding often comes directly from (1) _____. In the U.S. for example, it is the federal government that sponsors most national defense and space exploration projects.

Funding for science can also come from science (2) _____. In 1950, the U.S. Congress passed an act that established the National Science Foundation. This independent federal agency develops a national science policy and supports scientific research and education. Two other well-known foundations that are involved in disease research are the American Cancer Society and the National Heart Association.

Research is also conducted and supported by private-sector (3) _____ that employ scientists—especially from the applied sciences—who work in the development of industrial or commercial processes and products.

Scientific research is also supported by (4) _____ through professorships. Most professors do not just give classes but also conduct scientific research. Indeed, what many professors are looking for is the opportunity to work at a university where they can continue their own research. These are the professors whose students have the chance to observe real research at first hand. Most universities specialize in certain fields and they are frequently judged on the achievements of their research professors. Scientists whose research findings are published and talked about in scientific circles bring prestige to the institution where they work.

c Read the text again and find the words that mean the same as the following phrases.

1. very large (paragraph 1) _____
2. a law passed by a parliament, congress, etc. (paragraph 2) _____
3. use the services of someone or something (paragraph 3) _____
4. respect and admiration for someone or something of high quality (paragraph 4) _____

d In pairs, discuss and write definitions for the following terms from the text. Use a dictionary to help you.

1. the federal government
2. at first hand
3. the private sector
4. research findings
5. the applied sciences
6. in scientific circles

e Read the last two paragraphs of the text again and complete these sentences.

1. In paragraph 3, line 2, the pronoun *that* refers to _____
2. In paragraph 3, line 4, the pronoun *who* refers to _____
3. In paragraph 4, line 4, the pronoun *what* refers to _____
4. In paragraph 4, line 6, the pronoun *where* refers to _____
5. In paragraph 4, line 8, the pronoun *whose* refers to _____

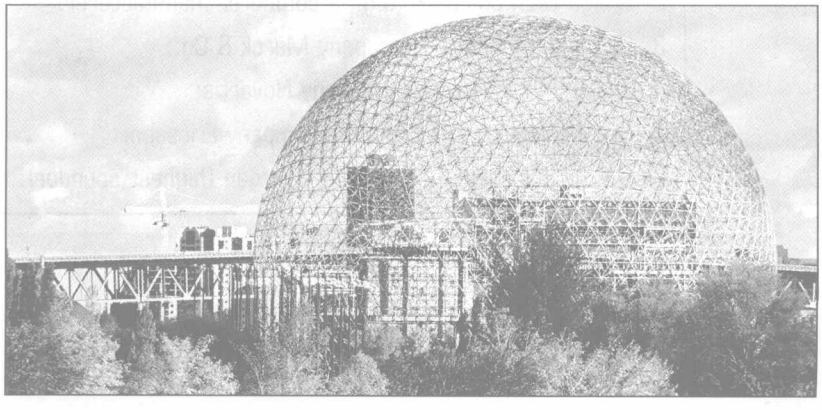
f Read and complete the sentences with appropriate relative pronouns. The first one has been done for you.

1. It is the Ministry of Science and Education ___*that*___ decides where to allocate funds.
2. This is Prof. Wilkinson _____ book was published last month.
3. The American Cancer Society, _____ is involved in disease research, is a well-known foundation.
4. You need to talk to Prof. Dawes _____ handles the admissions.
5. The difficult thing is _____ the department has no more money for research.
6. The application procedure _____ we have to follow is very complex.

g Complete these sentences with information that reflects your personal views.

1. In this country it is _____ that provides most of the money for scientific research.
2. In my opinion, what science students are looking for is _____.
3. In my opinion, _____ is the scientist whose work has had the greatest impact.
4. The institutions where many scientists want to work are _____.

h In small groups, compare and discuss your answers to Exercise g.



Lesson 2
Measuring and comparing R&D activity

a Discuss the following questions in pairs or small groups.

1. How can the level of R&D activity of a company be measured?
2. Which measure do you consider to be the best indicator of R&D activity?

b Listen and complete the notes. Check and compare your answers.

CD T-1

Indicators of R&D activity

1.
2.
3.
4.

c Read the sentences and circle *True* or *False*.

1. The larger the budget, the higher the level of R&D activity.	True	False
2. R&D intensity refers to the total amount of money spent on R&D.	True	False
3. R&D intensity information changes over time.	True	False
4. A high number of publications reflects a high level of R&D activity.	True	False
5. R&D intensity information is confidential.	True	False

d Look at the chart and estimate what percentage of their revenue companies spend on R&D.

Annual R&D expenditure as a percentage of revenue		
1. A typical U.S. industrial company:	*3.5*	% (approx) of revenue
2. A high-tech company, e.g., a computer manufacturer:	_____	% (approx) of revenue
3. U.S. pharmaceutical company Merck & Co.:	_____	% of revenue
4. Swiss pharmaceutical company Novartis:	_____	% of revenue
5. Swedish telecommunications company Ericsson:	_____	% of revenue
6. U.S. pharmaceutical company Allergan (highest spender):	_____	% of revenue

(Source: UK R&D Scoreboard, 2004)

e Listen and check your answers.

CD T-2

f Read and complete the text with the words from the box. The first one has been done for you.

costs	customer	failure	invest	precision
profit	profitable	R&D-intensive	spenders	unprofitable

The big (1) *spenders* in R&D tend to produce certain types of product—things like (2) _____ scientific instruments, medicines, high-tech weapons systems, navigation and safety devices for aircraft, etc. Whereas, typically, a manufacturing company might make a profit of 40% on its sales, the profits of these (3) _____ companies can range from 60% to as high as 90%. In other words, manufacturing (4) _____ represent only 10% of the price that the (5) _____ pays for the product—the remaining 90% being (6) _____. One might ask how these companies can justify figures like these. The explanation lies in the fact that, for them, R&D carries a high risk of (7) _____. A large part of the time and money that they (8) _____ in R&D does not create any (9) _____ products at all. So the high profits of a handful of successful products serve to offset the cost of numerous (10) _____ projects.

g Read the completed text and answer the questions.

1. For a typical manufacturing company, what percentage of sales represents profit? _____
2. In what manufacturing fields do R&D-intensive companies tend to operate?
   _____
3. What percentage of sales is profit for an R&D-intensive company? _____
4. Why is R&D a high-risk activity for some companies?
   _____

h In pairs, role-play a conversation in which a scientist from an R&D-intensive company explains the economics of R&D investment to a layperson.

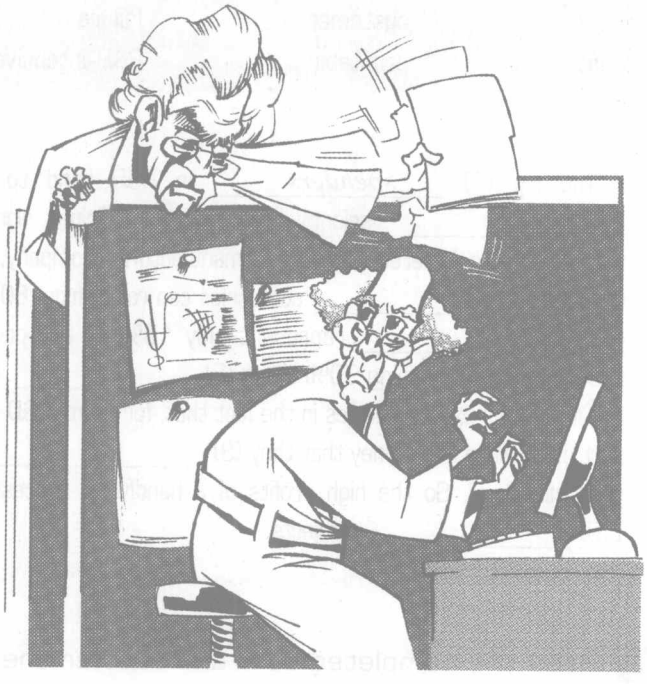
i In pairs or small groups, look for information on one or more of the topics in the box below and prepare an oral report.

1. Spending on R&D as a percentage of revenue in the place where you work
2. Spending on R&D as a percentage of revenue in a well-known company in your country
3. Reviews, journals, periodicals, etc., where scientists can get their research work published
4. The largest recipients of funding for research in your country
5. The process by which inventions and innovations are patented in your country

Lesson 3
Coordinating the members of the team

a Look at the cartoon and, in pairs, discuss what you think it is about.

b Read and complete the text with the connecting phrases from the box. Two of the expressions are in two parts. The first one has been done for you.



as a result
because
in order to
neither / nor
not only / but also
though

Laypeople often think of R&D scientists as solitary figures working in a laboratory on some abstract problem. (1) *Though* this may be true for a handful of scientists working on basic research, the vast majority work on R&D projects in teams. These project teams include (2) _____ scientists from various disciplines _____ representatives from diverse functional groups within a company, for example, marketing, manufacturing, and human resources.

Formerly, R&D projects were passed from one group of specialists to another in serial fashion. The term "throwing it over the wall" was often used to describe this way of working, in which each stage of the process was isolated from the others. Research evidence showed that this method was (3) _____ efficient _____ cost-effective (4) _____ it was very time-consuming.

Companies now bring together representatives from each stage of the process and, in this way, they try to achieve more cross-functional communication and participation. The goal is to coordinate processes better and to identify and avoid problems that otherwise might only be discovered later. (5) _____ work effectively in cross-functional project teams, scientists must have both up-to-date knowledge of their technical fields and also skill in communication, problem-solving, and group decision-making—all necessary for successful teamwork. (6) _____, universities are now giving more importance to the development of these skills, and companies are looking for ways to foster these attributes in training programs for their employees.

c In pairs, find synonyms for the following hyphenated phrases from the text.

1. cost-effective _____
2. cross-functional _____
3. time-consuming _____
4. up-to-date _____

d Read through the completed text and answer the questions.

1. According to the text, what is a common misconception about R&D scientists?

2. What sort of people make up an R&D project team nowadays?

3. Why is the term "throwing it over the wall" an appropriate one?

4. What is required of scientists who are working in cross-functional project teams?

e You have been assigned the task of choosing a project leader for an R&D project. Make notes of the qualities and skills that you think a good project leader should have.

R&D project leader

-
-
-
-
-
-

f Compare and discuss your answers in pairs.

g Listen to the discussion on choosing a project leader and compare your ideas with those that you hear.

CD T-3

h Combining your ideas with those that you heard in the conversation, complete the sentences describing the ideal qualities of a project leader. Add sentences of your own.

The ideal project leader is a person who

Ideally, the project leader should

History capsule

The earliest R&D laboratories were founded at the end of the nineteenth century in Germany by companies like Siemens, Krupp, and Zeiss. It was not until the years immediately preceding World War I that the major American companies started to take research seriously. It was during this time that Du Pont, General Electric, AT&T, Eastman Kodak, Westinghouse, and Standard Oil established laboratories for the first time.

Lesson 4

Working out a logical sequence

a Discuss the questions in pairs or small groups.

1. What sort of projects are you sometimes required to plan?
2. How do you plan a project?
3. Do you consider yourself to be a good planner?
4. What skills are required when planning a project?

CD T-4

b Listen to the interview about research and development projects and complete the notes.

1. The letters CPM stand for:

2. CPM is used to determine:

3. Timescale:

4. "Slack time":

5. Allocation of resources:

c Look at the words and phrases from the interview. Match each verb with the correct noun or noun phrase to form appropriate collocations. The first one has been done for you.

1. work out	*e*	a. resources
2. construct	_____	b. a timescale for a project
3. add up	_____	c. a delay
4. establish	_____	d. the total number of weeks
5. allocate	_____	e. a logical sequence
6. cause	_____	f. a diagram

d Look at the diagram and circle the correct options.

1. The total number of weeks needed to complete Project X is _____.
   a. 20 b. 21 c. 22 d. 23
2. Step E cannot be started until Step _____ has been completed.
   a. B b. C c. D d. F
3. Steps E and F can be done at the same time as Step _____.
   a. C b. D c. G d. H
4. Step H cannot be started until Steps _____ have been completed.
   a. E, F, and G b. A, C, and F c. A, D, and G d. A, B, and E
5. Step I can be done at the same time as Step _____.
   a. E b. F c. G d. H
6. The critical path is the sequence _____.
   a. A, B, E, H b. A, C, F, H c. A, D, G, H d. A, D, G, I

e In small groups, invent an R&D project and prepare a list of tasks that will have to be completed during the project. Include between eight and twelve steps, but do not include time allocations. Then pass your list to another group.

f Read through the other group's list of tasks and allocate a minimum time (in weeks) for the completion of each step and write this on the list. Then pass your list to another, different group.

g Read through the other group's list of tasks and time allocations and prepare a Critical Path diagram to show the minimum number of weeks that will be needed to complete the entire R&D project.