根据教育部2004年《大学英语课程教学要求（试行）》编写

大学能力英语选修课
系列教材

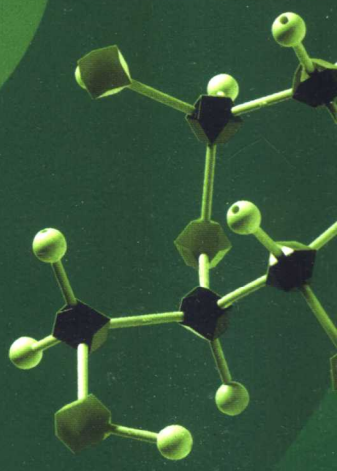
总顾问⊙胡壮麟
总主编⊙王正元

Science World II

大学能力英语

走进科学世界 II

ABILITIES IN ENGLISH FOR COLLEGE STUDENTS



主编⊙陆军　欧阳铨　主审⊙梁在明

Abilities in English
Task-based learning
Listening Speaking Reading
Writing Translating

机械工业出版社
CHINA MACHINE PRESS

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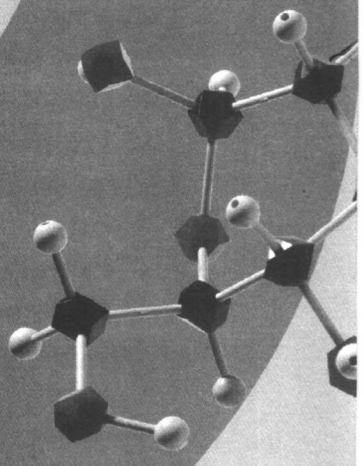

主编◎陆　军　欧阳铨
编著◎陆　军　欧阳铨　袁　菲
　　李宝峰　孟　晖
主审◎梁在明

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根据教育部2004年《大学英语课程教学要求（试行）》的精神，为保证学生大学英语学习四年不断线，由全国部分重点大学合作编写了这套大学能力英语选修课系列教材。

《大学能力英语》基于“以任务为导向”（task-based learning）的编写理念，突出语用行为原则，每单元围绕某一专题从听、说、读、写、译五方面训练学生的语言交际能力。每册图书配赠一张听力光盘。

《大学能力英语——走进科学世界Ⅱ》册涵盖网络生活、生物工程、科研揭密、人与自然、科技时尚等生动有趣的科研话题，共15个场景。

本书适合作为大学本科高年级非英语专业选修课教材，也可供学生自学使用。

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《大学英语课程教学要求〈试行〉》是当前我国大学英语教学改革的指导文件。这个文件对大学英语的教学性质和目标、教学要求、课程设置、教学模式、教学评估、教学管理都有详尽而清楚的阐述。字里行间，洋溢着崭新的现代教学理念。如：

“大学英语是以英语语言知识与应用技能、学习策略和跨文化交际为主要内容，以外语教学理论为指导，并集多种教学模式和教学手段为一体的教学体系。大学英语的教学目标是培养学生的英语综合能力和应用能力，特别是听说能力，使他们在今后工作和社会交往中能用英语有效地进行口头和书面的信息交流，同时增强其自主学习能力，提高综合文化修养，以适应我国社会发展和国际交流的需要。”

“各高等学校应当根据实际情况，……设计各自的大学英语课程体系，将综合英语类、语言技能类、语言应用类、语言文化类和专业英语类等必修课程和选修课程有机结合，……以确保不同层次的学生在英语应用能力方面得到充分的训练和提高。”

由于各校有关大学英语教学的领导和教师对这个文件非常熟悉，我不一一引述。我只想就这两段谈谈我的看法。我觉得《教学要求》颁布后，大学英语界，特别是出版社在出版大学英语教材方面的认识有所提高，如或在大学英语教材中增加听说内容，以弥补现有教材的不足；或单独编写或引进出版听说教材，从实处上突出听说教学；除纸质教材外，大力开发网络课程教学系统；在教材编写方面，尽量贯彻“个性化学习/自主式学习”的原则，等等。但我总觉得这还不够，大学英语界对上述第二条引文没有表现出太大的兴趣。人们似乎满足于“综合英语类”的教材和教学，对“语言技能类、语言应用类、语言文化类和专业英语类”的教材和教学考虑较少。事实上，没有这些选修课程的配合，很难实现“提高综合文化修养，以适应我国社会发展和国际交流的需要”；很难做到“必修课程和选修课程有机结合”；很难“保证不同层次的学生在英语应用能力方面得到充分的训练和提高”；也无法完成向“注重培养语言运用能力和自主学习能力的教学模式的转变”。

令人宽慰的是总有一些出版社（如出版本系列的机械工业出版社）和教师（如以王正元教授领衔的各校教师）目标明确、不惧困难，埋头苦干，众志成城。“大学能力英语选修课系列教材”的出版是最好的说明。我个人认为这套教材具有以下特色：

——教材编写依据上有《教学要求》，下有各校的具体需求。

——选材原则注意时代性、实用性、趣味性、多样性。

——编写原则突出任务型教学，反映了当代功能主义的教学理论。

——每个单元，围绕主题，听、说、读、写、译有效整合。

——培养学生在语境中自主学习，掌握语用能力。

显然，这些特色来自较多先进的教学理念，其核心是“任务型教学”。国内任务型教学在中小学教材和教学中出现较多，在大学圈内也有倡导的。从反馈看，肯定的多，持

异议的也有。如今“大学能力英语选修课系列教材”的出版，将为我们提供宝贵的经验。具体说，一套教材只有在使用中才能得到检验和完善。在学中干，在干中学，我们的编者本身就是在体验实施“任务型教学”。我相信他们能够成功。我预祝他们成功。

胡壮麟

2005 年 7 月

北京大学蓝旗营

前言

根据教育部《大学英语课程教学要求（试行）》“培养学生的英语综合应用能力，特别是听说能力，使他们在今后工作和社会交往中能用英语有效地进行口头和书面的信息交流，同时增强其自主学习能力，提高综合文化素养，以适应我国社会发展和国际交流的需要”的大学英语教学目标和“将综合英语类、语言技能类、语言应用类、语言文化类和专业英语类等必修课程和选修课程有机结合，形成一个完整的大学英语课程体系，以确保不同层次的学生在英语应用能力方面得到充分的训练和提高”的大学英语教学改革的要求，我们编写了这套大学能力英语选修课系列教材。我们在编写过程中力图使教材突出以下特点：

1. 确定以培养学生英语能力为目标

我们在编写这套教材时，大家认真讨论了这样一个问题：学习英语干什么？为了用英语交际。靠什么去交际？靠英语能力。所以我们在编写过程中坚持以培养学生英语能力为目标，而教学互动、情景功能、体验等最终应当落实在英语能力的打造上；英语能力是英语学习的最终目标，其他大多数都是为打造能力服务的方法；形成不了英语能力的学习，应该说是效果不佳的学习。所以，我们在这套教材编写大纲中确定了以培养学生英语能力为目标，把这套教材定名为“大学能力英语”。

2. 坚持“以任务为导向”（task-based learning）的外语教学理念

我们在教材编写中考虑的第二个问题是：既然教材的主旨是培养学生的英语能力，那么什么形式能更有效地培养学生的英语能力呢？语言专家和学者们经过长期的探索和经验积累提出了很多科学的外语教学法，这其中以完成任务为导向的学习法对培养学生英语能力更直接、更有效。比如说让学生去听两个美国人围绕一个话题说英语，按照范文去套写一篇英语文章，这样的学习者只是站在第三者的立场上为学习而学习，是一种模仿学习。这种学习往往是被动的、等待的，缺乏带着任务学的身临其境的感受和动力。如果把课程设计成让学生去完成某种任务，以言行事，以言取效，把语言看成是取效行为，这样会有力地调动学生的学习积极性。所以我们在编写这套教材时，尽量明确交际任务，让学生主动地去体验如何完成交际任务，把完成交际任务作为培养提升能力的导向。完成任务型的“实战演练”是培养、打造学生英语能力的有效方法。所以，我们设计的这套教材努力体现：任务的相关性，输入、活动、目标、教师角色、学生角色和环境任务构成的六个因素，输入、加工、输出行为，发展学生的思维能力和以言行事的言语取效行为。

3. 突出学习者为主体的角色行为

我们在编写这套教材时始终注意的另一点是，不要把学生看成单纯的英语学习者，单纯的学习者往往是被动的背诵者、复述者、消极地接受输入者，他们像站在圈外向圈内看的观众，因输入多、输出少而缺乏言语行为的动力。如果我们把学习者看成是任务

的完成者，把他们放到交际环境中去扮演一个角色，而且这个角色同他们将来可能的工作能结合到一起，这会使他们有一种完成任务的使命感，在以言行事的言语交际行为实践中提高在一定语境中的语用能力。我们考虑的另外一点是，一个人的能力是在实践中锻炼提高的，语言学习也是如此，如果脱离了语言实践，很难有真正的语言交际能力。所以我们在这套教材设计中把学习者设计成完成工作任务的“角色”，以增强语言交际锻炼的目的性、实践性；每课都以完成任务作为贯穿全篇培养英语听、说、读、写、译能力的主线，听、说、读、写、译的交际活动都是为了完成任务的交际行为，力求把任务的完成与学习者的岗位、责任、生涯意识结合在一起。

本套教材的构成及使用建议：

为了满足不同层次学生在英语应用能力方面得到锻炼和提高的要求和高校不同专业学生对不同专业英语的需求以及人才市场对就业学生英语能力的要求，本着实用性、知识性和趣味性相结合的原则，为学生的个性化、自主式学习提供选择和方便，这套大学能力英语选修课系列教材分四类共八本：《大学能力英语——走进国际商务》Ⅰ、Ⅱ；《大学能力英语——走进社交》Ⅰ、Ⅱ；《大学能力英语——走进多元文化》Ⅰ、Ⅱ；《大学能力英语——走进科学世界》Ⅰ、Ⅱ，可供非英语专业大学三、四年级作英语选修课教材，也可用作非英语专业大学英语任选课、必选课教材。每课包括以完成任务为主线的听、说、读、写、译五部分；每本书都附有听力 CD、练习答案，因此本套教材也可作为非英语专业学生的自修教材。

我国著名语言学家、博士生导师胡壮麟教授担任本套教材总顾问，燕山大学外语学院王正元教授担任总主编。各册主编分别为：

《大学能力英语——走进国际商务 Ⅰ》　王正元教授
《大学能力英语——走进国际商务 Ⅱ》　吴敏华副教授
《大学能力英语——走进社交 Ⅰ》　李冬琦教授　张东辉副教授
《大学能力英语——走进社交 Ⅱ》　王燕教授
《大学能力英语——走进多元文化 Ⅰ》　王正元教授
《大学能力英语——走进多元文化 Ⅱ》　张萍教授
《大学能力英语——走进科学世界 Ⅰ》　谢亚琴教授　钟秀平副教授
《大学能力英语——走进科学世界 Ⅱ》　陆军副教授　欧阳铨教授

本套教材的编写工作得到了主编单位的大力支持；哈尔滨工程大学、天津大学、辽宁大学、哈尔滨工业大学、燕山大学、天津医科大学、沈阳师范大学、北京外国语大学等十几所高校的三十余名英语专家教授、副教授、中青年骨干教师参加了本套教材的编写工作，英、美籍英语专家审读了全部书稿；燕山大学外语学院刘德慧院长、辽宁大学外语学院陈峰院长对本套教材的编写工作给予了大力支持，在此一并表示衷心感谢。

大学英语改革是一项艰巨而又十分重要的工作，教材建设任重而道远。编写这套以完成任务为导向、以培养交际能力为目的的教材是一种探索，一定会有缺点和不足，欢迎专家、学者、师生批评指正，提出改进意见。

王正元
2005 年元月

目 录

目　录

Unit 1

VoIP 网络电话

Tasks

Suppose you are Li Ming, a technician from a Chinese company newly arrived in America to make a research on VoIP technology. You should be able to:

- understand the given materials in this unit, communicate well with the manager and the engineer, then obtain your desired information from the activities;
- know about the technical terms and expressions for VoIP;
- write an article to compare VoIP phone system with traditional phone system, so that we know more about VoIP and make good use of it in our life or make further technological improvement.

I Listening

You are talking to Mr. Johnson, a manager working in a company providing VoIP service. Now you are listening to his brief introduction of VoIP technology. Warm up with the following words and phrases before listening to it.

Task A *Warm up with these words and phrases*

VoIP	(Voice over Internet Protocol) a technology that allows you to make telephone calls using a broadband Internet connection instead of a regular (or analog) phone line
protocol	a set of rules governing the format of messages exchanged between computers
telephony	the use of a telephone employing electrical variations or a system of such telephones for such transmission with or without connecting wires
analog	displaying a readout of information by a pointer or by hands on a dial, rather than by numerical digits (opposed to digital)
audio	of, relating to, or used in the sending, receiving, or producing of sound
digital	of, relating to, or using data in the form of numerical digits
circuit	a means of transmitting signals, usually two channels
PSTN	Public Switched Telephone Network
incur	to become liable for; to bring upon oneself
surcharge	an additional charge, tax, or cost added on to the usual charge
upshot	the final outcome; conclusion; result
Vonage	a broadband phone company, IP service provider
AT&T	American Telephone and Telegraph Company
FCC	the Federal Communications Commission
ramification	a consequence; outgrowth
browser	a piece of software which allows you to use the world wide web
vendor	a person or agency that sells

Task B ***Listening Comprehension: Listen to part of the news now and fill in the blanks***

If you've never heard of VoIP, get ready to change the way you think about (1) phone calls. VoIP, short for Voice over Internet Protocol, is also (2) to as Internet telephony, IP telephony, or Voice over the Internet (VOI). It's a (3) for taking analog audio (4), like the kind you hear when you talk on the phone, and turning them into digital (5) that can be transmitted over the Internet. It's a (6) of hardware and software that enables people to use the Internet as the transmission (7) for telephone calls by sending voice data in (8) using IP rather than by traditional (9) transmissions of the PSTN (Public Switched Telephone Network). For users who have free, or fixed-priced Internet (10), an Internet telephony software package provides free telephone calls anywhere in the world.

One advantage of VoIP is that the telephone calls over the Internet do not incur a surcharge (11) what the user is paying for Internet access, much in the same way that the user doesn't pay for sending (12) e-mails over the Internet.

How is this useful? VoIP can turn a (13) Internet connection into a way to place free phone calls. The practical upshot of this is that by using some of the free VoIP software that is available to make Internet phone calls, you are (14) the phone company (and its charges) entirely.

VoIP technology is available not only for companies and organizations, nowadays everyone can use it. IP-cards is an easy and effective solution to the problem of international calls. If you made up your mind to use IP-telephony, you need only make sure your telephone set can be (15) to tone dialing mode, and buy an IP-card.

VoIP is a (16) technology that has the potential to completely rework the world's phone systems. VoIP providers like Vonage have already been around for a little while and are growing (17). Major carriers like AT&T are already setting up VoIP calling plans in several markets around the United States, and the FCC is looking seriously at the potential ramifications of VoIP service. There are many Internet telephony applications available. Some, like CoolTalk and NetMeeting, come (18) with popular Web browsers. Others are stand-alone products.

Above all else, VoIP is basically a clever "(19) of the wheel". Once you are aware of the benefits and applications of Voice over IP, it is too good to (20). Perhaps that is why vendors are flooding the market with VoIP products and services.

Task C *True or False: Listen to the tape recording again*

Listen to the tape recording again, and choose T if you think the statement is true, and F if it is false.

Questions 1 – 10 are based on the talk:

T/F 1. VoIP is also referred to as Internet telephony, IP telephony, or Voice over the Internet (VoI).

T/F 2. VoIP is a method to turn analog audio signals into digital data that can be transmitted over the Internet.

T/F 3. VoIP sends voice data in packets by traditional circuit transmissions of the PSTN.

T/F 4. An Internet telephony software package provides free telephone calls for anyone anywhere in the world.

T/F 5. One advantage of VoIP is that the user doesn't have to pay for Internet access.

T/F 6. With VoIP, the telephone calls over the Internet are much in the same way as sending individual e-mails over the Internet.

T/F 7. VoIP can turn a standard Internet connection into a way to place free phone calls.

T/F 8. Using some of the free VoIP software available to make Internet phone calls, you don't have to pay the phone company.

T/F 9. Vonage, AT&T and the FCC are all major VoIP carriers.

T/F 10. According to the talk, Voice over IP has a lot of benefits and applications.

II Speaking

Task A *Situational Dialogue 1*

Hearing the introduction, you have some specific questions as follows, to ask Mr. Johnson:

- What are some advantages of VoIP?
- What kind of equipment do I need?
- If I have Internet Voice service, who can I call?
- Is there a difference between making a local call and a long distance call?
- How can I place a VoIP call?

The following words and phrases may help you with your job:

Key words and phrases

broadband	surf	cable modem	DSL
local area network	hook up	adaptor	subscriber
utilize	area code	headset	keyboard

Now work with a partner to make a conversation according to the above information. One of you will play the part of the Chinese technician, Li Ming; the other will play the part of Mr. Johnson.

Task B *Situational Dialogue 2*

After talking with Mr. Johnson, you are advised to call an engineer of his company, Mr. Howard, who makes research work on Internet and develop new products. Thus you have a chance to learn more about VoIP technology. Now you are making a conversation, which may include the following questions:

- What is VoIP exactly? How does it work?
- Can I use my computer while I talk on the phone?
- Does my computer have to be turned on?
- Can I take my phone adapter with me when I travel?
- What is its likely impact on business?
- What are some disadvantages of Internet Voice?

The following words and phrases may help you with your job:

Key words and phrases

convert	microphone	transmit	convergence
server	packetised	data traffic	sophisticated
infrastructure	WAN	impacted	maximize
outbound	outage	backup	dispatch

Now work with a partner to make a conversation according to the above information. One of you will play the part of the Chinese technician, Li Ming; the other will play the part of Mr. Howard.

III Reading

Task A *Words and Phrases Understanding*

Check if you understand the following words and phrases:

generic	shared by or including a whole group or class; not specific
bandwidth	a range within a band of frequencies or wavelengths
consolidation	uniting, bringing together (parts) into a single, larger form or organization
TDM	Telemetric Data Monitor
boost	to increase the strength or value of (sth.); to help or encourage
redundancy	the state of being redundant, unnecessary or superfluous
slash	a reduction in cost, price or amount
speech compression	condensing, shortening or abbreviating speech
implement	to fulfill, carry out
trunk	the main channel or line in a river, railroad, or other system
PBX	private branch (telephone) exchange
Intranet	A network based on TCP/IP protocols (an internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees, or others with authorization.
advent	an arrival; appearance; commencement
facsimile	an exact copy, such as of a book, painting, or manuscript
compatibility	(of a computer) ability to work with most of the software of another system
interface	something that makes it possible for separate elements to work together or communicate
ATA	analog telephone adaptor
socket	a hollow part that contains or fits into another part
configure	to arrange the parts or elements of a thing
handset	the receiver of a telephone, mobile phone
Ethernet	one of the most widely implemented LAN standards
Wi-Fi	wireless fidelity

DSL	digital subscriber line
ISP	Internet Service Provider
tinker	to work clumsily at anything
decompress	to subject to decompression; to undergo decompression (the act or process of releasing from pressure of compression)

Task 3 *Read the Passage and Try to Retell It*

Voice over IP

"Migrate to IP or risk being left behind." This seems to be the idea in the minds of vendors who have been using circuit switching infrastructures for the transportation of voice. As you are reading this article, the Internet is being modified to support voice traffic and products are being made to link the data and voice networks. Eventually the Internet and the telephone network will be one and the same.

Internet Telephony is an emerging technology and has a number of technological and evolutionary issues. The technological issues are mainly because the Internet was not designed for real time traffic such as voice and video. The evolutionary issues stem from the fact that a variety of vendors develop their products according to market demands and supplies. It will take time for all these products to converge and work with the same reliability as the circuit switched networks. However, the benefits of using IP as a generic platform for both data and real time applications are compelling enough to encourage resolution of these issues.

Benefits of the technology

The integration of voice and data traffic will be demanded by multi-application software. The inevitable evolution will be web servers capable of interacting with voice, data and images.

An integrated infrastructure that supports all forms of communication allows more standardization and lesser equipment management. The result is a fault tolerant design.

The integration of voice and data effectively fills up the data communication channels efficiently, thus providing bandwidth consolidation. The idea is to move away from the TDM scheme wherein the user is given bandwidth when he is not talking. Data networks do not do this. It is a big saving when one considers the statistics that 50% of a conversation is silence. The network efficiency can be further boosted, by removing the redundancy in certain speech patterns.

The Public Switched Telephone Networks' toll services can be bypassed using the

Internet backbone, which means slash in prices of the long distance calls. However, these reductions may slightly decrease when the Federal Communications Commission (FCC) removes the Enhanced Service Provider (ESP) status granted to Internet service providers (ISPs) by which they do not have to pay the local access fees to use the telephone company (TELCO) local access facilities. Access fees form a significant part of all long distance calls. But in spite of this, the circuit switched telephony would be expensive because of lack of bandwidth consolidation and speech compression techniques.

New Applications

- **Directory Services over Telephones**

Ordinary telephones can be enhanced to act as an Internet access device. Directory services could be implemented by submitting a name and receiving a reply.

- **Inter Office trunking over the corporate intranet**

The tie trunks between company owned PBXs could be replaced by an Intranet link and would provide large savings at a good quality of service.

- **Remote access to the office from your home**

One's home could be converted to a home office and gain access to the company's voice, data and fax services using the company's Intranet.

- **IP-based call centers**

With the advent of the Internet, companies have experienced large increase in their web site inquiries. These may not result in immediate financial transaction but at least people get to know about their products. This is the beginning of E-commerce. With VoIP there can be interaction with the customers.

- **Fax over IP**

Real time facsimile transmission is an immediate application of Voice over IP. Facsimile services which use dial-up PSTN services are affected by high cost for long distance, analog signal quality and machine compatibility. Instead a fax interface unit can convert the data to packet form, handle the conversion of signaling and controlling protocols and ensure complete delivery of the data in correct order.

The interesting thing about VoIP is that there is not just one way to place a call. There are three different "flavors" of VoIP service in common use today:

- **ATA** - The simplest and most common way is through the use of a device called an ATA (analog telephone adaptor). The ATA allows you to connect a standard phone to your computer or your Internet connection for use with VoIP. The ATA is an analog-to-digital converter. It takes the analog signal from your traditional phone and converts it into digital data for transmission over the Internet. Providers like Vonage and AT&T CallVantage are bundling ATAs free with their service. You simply crack the ATA out of the box, plug the cable from your phone that would normally go in the wall socket into the ATA, and you're ready to make VoIP calls. Some ATAs may ship with additional