# *EST Integrated Course*

# 科技英语综合教程

主编 刘爱军 王斌

**拓展** 高等学校英语拓展系列教程

语言技能类　　语言应用类　　语言文化类　　专业英语类

教师用书 Teacher's Book

外语教学与研究出版社
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外语教学与研究出版社
FOREIGN LANGUAGE TEACHING AND RESEARCH PRESS
北京 BEIJING

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# 总　序

　　随着我国对外科技交流的发展，科技英语作为交流的工具越来越受到人们的重视。为了帮助大学生提高科技英语阅读、写作和翻译能力，为他们在科技领域运用英语进行学习、研究和交流架起一座桥梁，我们编写了这套"科技英语系列教材"。

　　"科技英语系列教材"归属于"高等学校英语拓展系列教程"中的"专业英语类"，专为高等学校科技英语专业或理工科专业本科高年级学生及研究生专业英语课而设计，也可作为科研院所培养工程硕士、博士的培训教材，同时还可供广大科技工作者自学与参考之用。

　　本系列教材共有 5 本：《科技英语语法》（配教师用书）、《科技英语写作》（配教师用书）、《科技英语翻译》（配教师手册）、《科技英语阅读》及《科技英语综合教程》（配教师用书）。其内容涵盖通信、电子、计算机、环境、能源、生物技术与农业、遗传工程与医学、宇宙、纳米技术等多个热门科技专题，充分体现了当今科学技术的最新发展，反映了科学研究的探索与创新精神。本系列教材旨在提高学生阅读、翻译、写作相关专业论文或学术作品的能力。

　　本系列的 5 本教材是有机关联的一个整体：

　　《科技英语语法》是核心，总结了科技英语的特殊语法现象，剖析了科技英语学习中的重点、难点及容易忽视的语言点。为科技英语阅读、翻译和写作打下语言基础。

　　《科技英语翻译》融专业知识学习与翻译技能训练于一体。讲练结合，注重实践，帮助学生在掌握翻译技巧的基础上通过练习融会贯通。

　　《科技英语写作》分为单句写作、论文写作、应用文写作三大部分：单句写作部分深入剖析了科技英语的词法、句法特征，并归纳总结出科技英语写作中

的常用句型及表达方式，精辟实用。论文写作部分论述了科技论文的语篇及结构特征。应用文写作部分结合各类实用范文，介绍了英文书信、个人简历等的写法。

《科技英语阅读》以阅读为载体，旨在帮助学生提高科技英语阅读、翻译和写作的综合运用能力。课文精选最新英美期刊、专著及科普读物，语言地道、内容实用。

《科技英语综合教程》综合体现科技英语的特点，是连接大学英语基础阶段学习和科技类专业英语学习的桥梁。

希望本系列教材成为您全面提升科技英语水平的良师益友，不当之处诚请指正。

秦荻辉

2006 年 2 月

于西安电子科技大学科技英语研究中心

# 前 言

为适应我国高等教育发展的新形势,深化教学改革,尤其是教学模式的改革,提高教学质量,满足新时期国家和社会对人才培养的需要,2004 年 6 月教育部制定颁布了《大学英语课程教学要求(试行)》,以此作为高等学校进行大学英语教学的主要依据。

《大学英语课程教学要求(试行)》将大学阶段的英语教学分为三个层次:一般要求、较高要求和更高要求。一般要求是高等学校非英语专业本科毕业生应达到的基本要求;较高要求和更高要求是对那些学有余力、英语基础好的大学生设置的。这就提出了要保持大学英语四年学习不断线的问题。因此,我们编写了这本《科技英语综合教程》,为那些基础好的学生进一步提高英语水平提供学习素材及学习方法。

本书是《科技英语综合教程》的教师用书,供教师参考使用。各单元按以下部分编写:

1. About This Unit:对本单元的两篇课文做简要介绍,起到导入的作用。

2. Text A

　(1) Background Information:对课文 A 中涉及到的背景知识进行解释说明,包括相关人物、机构、专有名词等。此部分涵盖内容较多,是难点,因此采用中英文解释,中文只是概括说明,不是翻译,目的是帮助教师了解大意,可以根据教学需要增减。

　(2) Language Points:针对语言点进行讲解,包括单词、词组及用法。某些单词及词组在本单元中的特殊意义是重点。单词和词组均给出了英文释义。此外对于部分难句也进行了讲解分析。

　(3) Answers to the Exercises:给出了练习的参考答案,包括写作部分。

　(4) Translation of Text A:提供课文 A 的参考译文。

3. Text B

　(1) Background Information:对课文 B 中涉及到的背景知识进行解释说明。

　(2) Language Points:针对课文 B 中的语言点进行讲解。

　(3) Answers to the Exercises:给出了练习的参考答案。

使用建议：

1. 课堂讲解以课文 A 为主课文，课文 B 为学生课下自学内容。每周两学时，两周进行一个单元。

2. 课文涉及到不同专业，有一定难度，教师可根据本校情况，让相关专业学生参与到教学中，教师与学生共同完成相关单元的教学任务。

3. 教学班级原则上不超过 120 人。可以进行分组讨论，作业可采取抽查方式检查。

4. 教师可根据自己的教学实际情况和安排删选上述内容。每学期至少进行 7 – 8 单元。

本书在编写过程中，美国朋友 Joel Lintner 教授、北京邮电大学语言学院卢志鸿教授对教材进行了深入细致的审校工作，同时，本书还得到了相关领域专业人士江其生、陈广新、金长善、周鸣虎等的帮助。在此我们对所有关心、支持和参与本书编写工作的人士表示衷心的感谢。

由于本书涉猎的学科面较广，在编写过程中专业知识方面的疏漏之处在所难免，敬请各学科的专家和读者及时告知，给予批评指正。

编者
2007 年 7 月
于北京邮电大学

# Contents

# Unit 1
# Mathematics

## About This Unit

In this unit, the recent development and application of modern mathematics are introduced into two fields. One is Game Theory which is a powerful tool that can explain and address many social problems. Game Theory received special attention with the awarding of the Nobel Prize in economics to Nash, John Harsanyi, and Reinhard Selten. Now it has been broadened theoretically and applied to many social problems. The other field is Digital Signature, which is the latest focus of mysterious cryptography studies. In text B, many current applications of digital signature technique are illustrated. By reading the article, readers can understand the basic concepts and principles of Digital Signature and may have a keen interest in furthered cryptography.

## Text A

## Game Theory

### I. Background Information

1. **Avinash Dixit and Barry Nalebuff**: Avinash Dixit is Professor of Economics at Princeton University. Barry Nalebuff is Professor of Management at Yale University's School of Organization and Management.

   阿维纳什·迪克斯特是普林斯顿大学经济学教授。巴里·内尔巴夫是耶鲁大学组织和管理学院管理学教授。

2. **Game Theory**: Game theory is the mathematical analysis of any situation involving a conflict of interest, with the intent of indicating the optimal

choices that, under given conditions, will lead to a desired outcome. Although game theory has roots in the study of such well-known amusements as checkers, tick-tack-toe, and poker—hence the name—it also involves much more serious conflicts of interest arising in such fields as sociology, economics, and political and military science.

博弈论，有时也称为对策论，是应用数学的一个分支，是研究具有斗争或竞争性质现象的数学理论和方法，也是运筹学的一个重要学科。目前在生物学、经济学、国际关系、计算机科学、政治学、军事战略和其他很多学科都有广泛的应用。

3. **zero-sum games** (Para. 1): A situation in which a gain by one person or side must be matched by a loss by another person or side. A game is said to be a zero-sum game if the total amount of payoffs at the end of the game is zero. Thus, in a zero-sum game the total amount won is exactly equal to the amount lost.

零和博弈 (非合作博弈)，一人或一方得益必然引起另一人或另一方损失的局面。

4. **Princeton** (Para. 2): Princeton is a city in Green Lake County, United States. Princeton University is a coeducational private university located in Princeton, New Jersey. It is the fourth-oldest institution of higher education in the U.S. and is one of the eight Ivy League universities. Originally founded at Elizabeth, New Jersey in 1746 as the *College of New Jersey*, it relocated to Princeton in 1756 and was renamed *Princeton University* in 1896. Princeton has traditionally focused on undergraduate education and academic research, though in recent decades it has increased its focus on graduate education and now offers a large number of top-rated professional Master's degrees and PhD programs in a range of subjects.

普林斯顿，美国地名，位于新泽西州。文中指普林斯顿大学 (Princeton University)，普林斯顿大学为美国顶尖名校，常春藤盟校之一，在学术上具有极高的声誉。

5. **John von Neumann** (Para. 2): He was a Hungarian-born American mathematician and made contributions to quantum physics, functional analysis, set theory, economics, computer science, topology, numerical analysis, hydrodynamics (of explosions), statistics and many other mathematical fields as one of world history's outstanding mathematicians. Most notably, von Neumann was a pioneer

of the modern digital computer and the application of operator theory to quantum mechanics, a member of the Manhattan Project and the Institute for Advanced Study at Princeton, and creator of game theory and the concept of cellular automata. Along with Edward Teller and Stanislaw Ulam, von Neumann worked out key steps in the nuclear physics involved in thermonuclear reactions and the hydrogen bomb.

约翰·冯·诺依曼 (1903-1957)，匈牙利裔美国数学家，普林斯顿大学和普林斯顿高等研究所教授，曾任研制原子弹的顾问，并参加研制计算机，被称为计算机之父，1954 年成为美国原子能委员会委员。作为 20 世纪最杰出的数学家之一，他在数理逻辑、测度论、格论和连续几何学方面都有开创性的成果；在博弈论和控制论、力学、经济学和计算机研制等领域做出了杰出的贡献。他同莫根·施特恩合作，写出《博弈论和经济行为》(*Theory of Games and Economic Behavior*, 1947) 一书，这是博弈论中的经典著作，使他成为数理经济学的奠基人之一。

6. **tic-tac-toe** (Para. 6): Tic-tac-toe is a game in which two players alternately put crosses(x) and circles(o) in one of the compartments of a square grid of nine spaces; the goal is to get a row of three crosses or three circles before the opponent does.
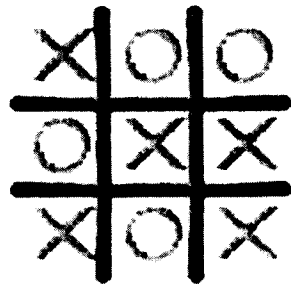
井字棋，一种益智游戏。两人轮流在一井字形方格内画 "x" 和 "o"，以先列成一行者得胜。

7. **John Nash** (Para. 8): John Forbes Nash, Jr. (born on June 13, 1928) is an American mathematician who works in game theory and differential geometry. He shared the 1994 Nobel Prize in Economics with two other game theorists, Reinhard Selten and John Harsanyi. He is best known in popular culture as the subject of the Hollywood movie, *A Beautiful Mind*, about his mathematical genius and his struggles with schizophrenia.

约翰·纳什，1928 年 6 月 13 日出生于美国西弗吉尼亚州，1950 年获得美国普林斯顿高等研究院数学博士学位，1951 年至 1959 年在麻省理工学院 (MIT) 数学中心任职。现任普林斯顿大学数学系教授，美国科学院院士。国际公认的博弈论创始人之一，是继冯·诺依曼之后最伟大的博弈论大师之一。纳什主要在纯数学领域从事学术研究，其数学成就十分突出。然而，

他对经济学研究产生重大影响的还是在博弈论上，可以概括为两点：第一，纳什明确地区分了合作对策与非合作对策，并指出，在合作对策中可以达成有约束力的协议，而在非合作对策中，则不能达到；第二，对于两人以上的非合作对策，可能出现什么样的结果，纳什提出了分析方法，这一方法可以用"纳什均衡"来称谓。后来对博弈论的许多讨论，都是建立在纳什均衡这一概念之上的，他提出的著名的纳什均衡的概念在非合作博弈理论中起着核心的作用。后续的研究者对博弈论的贡献，都是建立在这一概念之上的。由于纳什均衡的提出和不断完善为博弈论广泛应用于经济学、管理学、社会学、政治学、军事科学等领域奠定了坚实的理论基础，1994年纳什因此获得诺贝尔奖经济学奖。

8. **Nash equilibrium** (Para. 8): Nash equilibrium, named after John Nash, is a set of strategies or actions which are dominant (or best) for each player in the game, regardless of the action taken by any other player.

纳什均衡，又称为非合作博弈均衡，是博弈论的一个重要术语，以约翰·纳什命名。在一个博弈过程中，无论对方的策略选择如何，当事人一方都会选择某个确定的策略，则该策略被称作支配性策略。如果两个博弈的当事人的策略组合分别构成各自的支配性策略，那么这个组合就被定义为纳什均衡。一个策略组合被称为纳什均衡，当每个博弈者的均衡策略都是为了达到自己期望收益的最大值，与此同时，其他所有博弈者也遵循这样的策略。

9. **prisoners' dilemma** (Para. 10): In game theory, the prisoner's dilemma is a type of non-zero-sum game in which two players can cooperate with or defect (i.e. betray) the other player. In this game, as in all game theory, the only concern of each individual player ("prisoner") is maximizing his/her own payoff. In the classic form of this game, cooperating is strictly dominated by defecting, so that the only possible equilibrium for the game is for all players to defect. In simpler terms, no matter what the other player does, one player will always gain a greater payoff by playing defect. Since in any situation playing defect is more beneficial than cooperating, all rational players will play defect.

囚徒困境，博弈论的经典案例。囚徒困境是博弈论的非零和博弈中具代表性的例子，反映个人最佳选择并非团体最佳选择。虽然困境本身只属模型性质，但现实中的价格竞争、环境保护等方面，也会频繁出现类似情况。单次发生的囚徒困境，和多次重复的囚徒困境结果不会一样。在重复的囚

徒困境中，博弈被反复地进行。因而每个参与者都有机会去"惩罚"另一个参与者前一回合的不合作行为。这时，合作可能会作为均衡的结果出现。欺骗的动机这时可能被受到惩罚的威胁所克服，从而可能导向一个较好的、合作的结果。

10. **Cortés** (Para. 16): Hernando Cortés was the conquistador who became famous for leading the military expedition that initiated the Spanish Conquest of Mexico. Cortés was part of the generation of European colonizers that began the first phase of the Spanish colonization of the Americas.

赫尔南多·科尔蒂斯，16 世纪殖民时代活跃在中南美洲的西班牙殖民者，以摧毁阿兹特克 (Aztec) 古文明，并在墨西哥建立西班牙殖民地而闻名。

11. **Polaroid Corporation** (Para. 16): （美国）宝丽来公司，以即时成像技术而闻名。

12. **Kodak** (Para. 16): （美国）柯达公司，世界上最大的影像产品及相关服务的生产和供应商，总部位于美国纽约州罗切斯特市，在纽约证券交易所挂牌的上市公司，业务遍布 150 多个国家和地区。自 1880 年成立以来，柯达一直在全球影像行业中保持领先地位，业务多元化，涵盖传统卤化银技术和数码影像技术各方面。目前，柯达公司主要从事传统和数码影像产品的生产和服务。

13. **strategy of brinkmanship** (Para. 17): Brinkmanship refers to the policy or practice, especially in international politics and foreign policy, of pushing a dangerous situation to the brink of disaster in order to achieve the most advantageous outcome, by forcing the opposition to make concessions.

边缘化策略。边缘化策略指在国际政治和外交活动中，故意使局势变得无法控制的策略，正是由于局势的无法收拾可能令其他对手难以接受，从而迫使对手作出妥协。

14. **Thomas Schelling** (Para. 17): Thomas Crombie Schelling (born on 14 April 1921) is an American economist and professor of foreign affairs, national security, nuclear strategy, and arms control at the University of Maryland, College Park School of Public Policy. He was awarded the 2005 Nobel Prize in Economics (shared with Robert Aumann) for "having enhanced our understanding of conflict and cooperation through game theory analysis". Schelling received his bachelor's degree in economics from the University of California, Berkeley in 1944. He received his PhD in economics from Harvard University in 1951. Schelling's most famous

book, *The Strategy of Conflict* (1960), has pioneered the study of bargaining and strategic behavior and is considered one of the hundred books that have been most influential in the West since 1945. In this book he introduced the concept of the focal point, now commonly called the Schelling point. Schelling's economic theories about war were extended in *Arms and Influence* (1966).

托马斯·谢林 (1921-)，2005 年诺贝尔经济学奖获得者，1951 年获得哈佛大学经济学博士学位，曾在美国哈佛大学肯尼迪学院执教 20 年，担任政治经济学教授，并获得退休名誉教授的称号，1991 年被选为美国经济学协会会长，现在美国马里兰大学公共政策学院和经济系担任教授，并获得退休名誉教授称号。他教授的课程除包括经济学理论外，还涉及外交、国家安全、核战略以及军控等多方面。谢林重要的理论著作包括《冲突战略》、《武器与影响》等，其中前者是相关领域中最具有开创性的理论著作之一。他的理论和思想不仅运用在经济学分析中，在外交、军事领域也影响深远。

15. **Winston Churchill** (Para. 19): He was the English statesman and author, best known as Prime Minister of the United Kingdom during the Second World War. Well-known as an orator, strategist, and politician, Churchill was one of the most important leaders in modern British and world history. He won the 1953 Nobel Prize in Literature for his many books on English and world history.

温斯顿·丘吉尔 (1874-1965)，二战期间英国首相，英国传记作家、历史学家、政治家，1953 年诺贝尔文学奖获得者。19 世纪 30 年代法西斯势力崛起，欧洲形势日益紧张，丘吉尔坚决反对英法等国的绥靖政策，成为强硬派领袖。他到处发表演说，揭露法西斯的危险。他的演说滔滔雄辩，警句迭出，被公认为出类拔萃的大演说家。1939 年，第二次世界大战爆发，1940 年，他临危受命，出任英国首相，领导英国人民保卫英伦三岛，并积极展开外交活动，与美苏结盟，形成国际反法西斯统一战线，为世界反法西斯战争的最后胜利作出了重大贡献。

## II. Language Points

1. The games it studies *range* from chess to child rearing and from tennis to *takeovers*. (Para. 1)

Paraphrase: The games it (game theory) studies extends from chess to child bringing-up and from tennis to handovers.

**range**: *v.* to vary between limits, extend, run in a line

eg: The price *ranges* from $30 to $80.

The boundary *ranges* from north to south.

**takeover**: *n.* the act or an instance of assuming control or management of or responsibility for sth.

eg: The economy of Hongkong goes well after its *takeover*.

2. Game theory was *pioneered* by Princeton mathematician John von Neumann. (Para. 2)

**pioneer**: *v.* to be a pioneer; to originate (course of action etc., followed later by others)

eg: The new treatment for cancer was *pioneered* by the experts of state hospital.

*n.* original investigator of subject or explorer or settler; initiator of enterprise

eg: The young generation was greatly motivated by the *pioneers'* exploits.

The *pioneers* of Puritans settled down in New England.

3. That is, the participants were supposed to choose and implement their actions jointly. (Para. 2)

Paraphrase: That is, the players were expected to select and carry out their actions together.

4. ...he must *anticipate* and overcome resistance to his plans. (Para. 3)

**anticipate**: *v.* 1) to expect or realize beforehand; to foresee

eg: The experts are *anticipating* the negative effects of air pollution.

The directors *anticipated* a fall in demand/that demand would fall.

2) to deal with or use before proper time

eg: Ted was not used to saving monthly and he would always *anticipate* his income.

5. The *essence* of a game is the *interdependence* of player strategies. (Para. 4)

**essence**: *n.* 1) the quality which makes a thing what it is; the inner nature or most important quality of a thing

eg: Is the *essence* of morality right intention?

The two things are the same in outward form but different in *essence*.

2) extract obtained from a substance by taking out as much of the mass as possible

eg: milk *essence*