21世纪高职高专规划教材系列

电子信息技术

专业英语

丁　宁　主编
何　娴　主审

机械工业出版社
CHINA MACHINE PRESS

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本教材的内容主要分为四大部分：电子学基础、计算机基础与应用、通信知识、电子信息新技术的选读部分。电子学基础部分主要介绍了基本的电物理量、半导体、集成电路、放大器、数字电路、仪器仪表知识；计算机基础及应用部分主要介绍了计算机基础知识、网络知识、计算机安装使用手册、Office 2000 系列、多媒体、ISDN 等；通信知识部分主要介绍了通信系统的框图、脉冲编码调制方法、ATM 异步传输模式、光纤通信、卫星通信、基本蜂窝移动电话系统等；电子信息新技术选读部分主要介绍了数字电视、GPS 全球定位系统、蓝牙技术、3G 技术、DSP 数据信号处理、软件无线电等热门技术。

本教材的内容由浅入深、选材广泛、通俗易懂、形式多样，适合高职高专电子信息类和通信类专业的学生使用。教学中可根据具体教学要求进行内容的取舍，以满足不同层次学生的需要。

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出 版 说 明

为了贯彻国务院发［2002］16 号文件《国务院关于大力推进职业教育改革与发展的决定》的精神，进一步落实《中华人民共和国职业教育法》和《中华人民共和国劳动法》，实施科教兴国战略，大力推进高等职业教育改革与发展，我们组织力量，对实现高等职业教育培养目标和保证基本教学规格的文化基础课程、专业技术基础课程和重点建设专业主干课程的教材进行了规划和编写。

本套教材内容涵盖了普通大专院校计算机及非计算机专业的文化基础课、专业基础课、专业课以及选修课程，主要分为文化基础、编程语言、硬件技术、网络信息、数据库应用及多媒体技术等几大类。为配合高职教育关于“培养 21 世纪与我国现代化建设要求相适应的一线科技实用型人才”的最新理念，我们特为本系列教材配备了实践指导丛书，以利于老师的教学和学生的学习。

本套教材以理论教学和实践教学紧密结合，图文并茂、内容实用、层次分明、讲解清晰，其中融入了作者长期的教学经验和丰富的实践经验，可用作各类大专院校、职业技术学校的教材，也可作为各类培训班的教材。

前　言

近年来高等职业教育越来越受到人们的重视，成为我国高等教育的重要组成部分。随着科学技术的迅猛发展，国际化的技术交流和经济合作日益频繁，高等职业教育的教学思想、教学模式也随之不断变革。这就要求高职教材必须进行相应的调整与重新定位，以适应新的社会发展需求，培养出新一代实用综合型的技术人才。

本教材的编写突出了高等职业教育的实用特点，与新技术紧密结合。具体体现如下：

- 课文的取材多选自原版的专业资料或专业英语教科书，语句原汁原味，不仅表达简练、顺畅、纯正，而且具有一定的趣味性，易于阅读和理解。
- 课文的内容涉及电子学、仪器仪表、计算机、ATM、ISDN、光纤通信、卫星通信、移动通信等方面，基本覆盖了当代电子信息技术的各个领域。同时，收录了一些电子信息新技术发展前沿方面的文章（如数字电视、GPS 全球定位系统、蓝牙技术、3G 技术、DSP 数字信号处理、软件无线电等）作为选读课文。课文内容丰富、题材广泛、通俗易懂，可以满足不同层次的教学要求。
- 在每篇课文之前，首先提供与课文内容相关的讨论问题，以使学生对课文知识有所了解，更主要的目的是给学生更多的发挥想象的空间，并营造以学生为主体的教学环境，促进学生自主学习。
- 课文中穿插了专业英语实用技能环节介绍，包括专业英语的词汇和语法学习介绍，原版产品技术说明书和维修手册，以及与公司面试相关的系列技能训练，有针对性地培养学生的实用技能。
- 教材中还配有大量实用专业英语会话，通过口语练习，使学生能够在专业技术方面运用英语进行简单交流，避免专业英语教学中普遍存在的哑巴英语现象，提高专业人才的沟通技能和综合素质，以适应国际经济发展的需要。
- 教材的附录部分不仅配有课文的翻译，还介绍了大公司的机构部门、世界著名电子信息类公司、电类工厂名称等，以改变学生对公司、企业缺乏了解的现状。
- 使用本教材时，建议每课安排 5～6 学时。考虑到具体的教学安排和教学对象，教师可根据需要对教材内容进行取舍。

本书由南京信息职业技术学院的丁宁老师担任主编，主要负责课文内容、阅读材料、专业技术会话的选材和整体编排以及课文翻译、注释、练习、附录的编排，并统编全稿；郭曦老师担任副主编，主要负责编写实用英语技能部分及一篇面试英语会话内容，并参与了教材内容布局的设计；孙玥老师主要负责对通信课文及选读材料进行初稿翻译，对部分练习进行编制及全部单词的注音工作；何娴副教授担任本书主审，审阅了全部书稿，参与了教材的部分具体实施工作，而且对教材提出了许多宝贵的修改意见。本书在编写过程中还得到系主任华永平副教授的关心和支持。在此，对所有指导和帮助过本书出版的老师表示深深的敬意和感谢。

由于编者水平有限，时间仓促，书中难免存在不足之处，希望尊敬的教师、同学和广大读者批评指正。

编　者

目　录

Part Four New Technlogy for Free Reading

Part One Electronics

Unit 1 Charge, Current and Voltage

Technical terms:

positive charge	正电荷
negative charge	负电荷
electric current	电流
free electron	自由电子
electromotive force (EMF)	电动势
potential difference	电位差

Questions for text discussion:

What fundamental particles is an atom composed of ?
Which letter is usually used to denote the charge symbol ?
What is the basic unit of voltage?

Text

As we know, matter is made up of atoms, which are composed of a number of fundamental particles. The most important of these particles are protons and neutrons found in the nucleus of the atom and electrons moving in orbit about the nucleus. Normally the atom is electrically neutral, the negative charge of the electrons balancing the positive charge of the protons. Particles may become negatively charged by gaining electrons from other particles.

As an example, we may produce a negative charge on a balloon by rubbing it against our hair. The balloon will then stick to a wall or the ceiling, which are uncharged. Relative to the negatively charged balloon the neutral wall and ceiling are oppositely charged. We now define the coulomb(C) by stating that the charge of an electron is a negative one of 1.60218×10^{-19} coulombs. Putting it another way, a coulomb is the charge of about 6.24×10^{18} electrons. The symbol for charge will be taken as Q or q.

The primary purpose of an electric circuit is to move or transfer charges along specified paths. This motion of charges constitutes an electric current, denoted by the letters i or I, taken from the French word "intensitè". Finally, current is the time rate of change of charge, given by $i=dq/dt$ .The basic unit of current is the ampere (A). An ampere is 1 coulomb per second.

Charges (free electrons) in a conductor , may move in a random manner. However, if we

want some concerted motion on their part, we must apply a so-called electromotive force (EMF). Thus work is done on the charges. We shall define voltage "across" an element as the work done in moving a unit charge (+1C) through the element from one terminal to the other. The unit of voltage, or potential difference, as it is sometimes called, is the volt(V).

New words:

1. atom ['ætəm] *n.*原子
2. particle ['pɑ:tikl] *n.*粒子
3. proton ['prəutən] *n.*[核]质子
4. positive ['pɔzətiv] *adj.*正的，积极的
5. charge [tʃɑ:dʒ] *n.*电荷
6. neutron ['nju:trɔn] *n.*中子
7. nucleus ['nju:kliəs] *n.*(原子）核
8. negative ['negətiv] *adj.*负的，消极的
9. balance ['bæləns] *n.*平衡
10. ceiling ['si:liŋ] *n.*天花板
11. define [di'fain] *vt.*定义，阐述
12. denote [di'nəut] *vt.*指示，表示
13. electron [i'lektrɔn] *n.*电子
14. constitute ['kɔnstitju:t] *vt.*组成，构成
15. electric [i'lektrik] *adj.*电的
16. current ['kʌrənt] *n.*电流
17. conductor [kən'dʌktə] *n.*导体
18. voltage ['vəultidʒ] *n.*电压
19. element ['elimənt] *n.*元素，元件

Expressions:

be made up of	由……组成
be composed of	由……组成
stick to	粘住
define...as...	把……定义成……

Notes to the text:

The most important of these particles are protons and neutrons found in the nucleus of the atom and electrons moving in orbit about the nucleus.

这些粒子中最重要的是原子核中的质子和中子及在轨道上绕核运动的电子。

其中的 found in the nucleus of the atom 为过去分词短语作定语修饰先行词 protons and neutrons , protons and neutrons 与 electrons 并列做表语，而 moving in orbit ... 为现在分词短语作定语，修饰 electrons。

Exercises

1. Translate the following phrases and expressions.

(1) 正、负粒子

(2) 电荷随时间的变化率

(3) free electrons

(4) 电位差

(5) to move in a random manner

2. Fill in the blanks with the words given below.

current *voltage* *positive* *negative* *conductors*

(1) The algebraic(代数的) sum of the _____ entering any node(节点) is zero.

(2) The electric field always does _____ work on the charge.

(3) Electrons, as one knows, are minute (微小的) _____charges of electricity.

(4) Semicoductors are neither good _____ nor good insulators(绝缘体).

(5) The algebraic sum of the _____ around any closed path(路径) is zero.

3. Tell what the underlined words mean here.

(1) Matter is made up of atoms, which are composed of a number of fundamental particles.

(2) As an example, we may produce a negative charge on a balloon by rubbing it against our hair.

(3) The unit of voltage , or potential difference, as it is sometimes called, is the volt(V).

(4) The balloon will then stick to a wall or the ceiling, which are uncharged.

(5) We now define the coulomb(C) by stating that the charge of an electron is a negative one of 1.60218×10^{-19} coulombs. Putting it another way, a coulomb is the charge of about 6.24×10^{18} electrons.

4. Choose the appropriate words or expressions to fill in the blanks.

(1) The switch, resistor (电阻)and wire _____ (are composed of, constitute) a circuit.

(2) A computer _____ (consists of, makes up) an input/output(I/O)device, a memory, a control section, and an arithmetic(算数的) and logic unit.

(3) A molecule(分子) of water _____ (is composed of, composes) three atoms—two of hydrogen (氢)and one of oxygen.

(4) The flow of electrons _____ (is made up of, makes up) electric current.

(5) The lines of flux(磁力线) which _____ (are made up of, constitute) the magnetic field cut across the wire.

5. Translate the following sentences into English.

(1) 原子是由原子核及绕核运动的电子组成的。

(2) 电荷的移动形成了电流。

(3) 电动势可对电荷作功。

Reading

Electric Current

Quite a few years ago, scientists had very vague(模糊的) ideas about electricity. Many of them thought of it as a sort of "fluid"（流体）that flowed through wires as water flows through pipes, but they could not understand what make it flow. Many of them felt that electricity was made up of tiny particles of some kind, but trying to separate （把……分开）electricity into individual particles baffled（使受挫）them.

Then, the great American scientist Milikan, in 1909, astounded （使震惊）the scientific world by actually weighing a single particle of an electricity and calculating its electric charge. This was probably one of the most delicate（棘手的） weighing jobs ever done by man, for a single electric particle weighs only about half of a millionth of a millionth of a millionth of a millionth of a millionth of a pound.

They are no strangers to us, these electric particles, for we know them as electrons. When large numbers of electrons break away from their atoms and move through a wire, we describe （描述）this action by saying that electricity is "flowing" through the wire(导线). Yes, the electric "fluid" that early scientists talked about is nothing more than electrons flowing along a wire.

Useful Skill

科技英语的特点

科技文体（Scientific writing）有其独特的语体，这是由科学技术本身的性质所决定的。它与普通英语相比具有如下的特点：

一、无人称（*Impersonal*）

科技文体第一个显著的特点就是句子往往没有人称代词，即所谓的无人称句。科技文章描述和讨论的大多是科学发现或科技事实。尽管科技活动系人类所为，但由于科技文章所报告的主要是这种科技活动的结果或自然规律，而不是报告这些结果或自然规律是由谁发现或完成的，因此，大多数科技文章很少使用有人称的句子。

例如：The junction transistor is the most widely used active device in present-day electronic circuits.

结型晶体管是当前电子线路中使用最广泛的有源器件。

An important function of NOT gate is to produce an output signal that is opposite in nature to the input signal.

非门的重要功能是产生与输入相反的输出。

但需要说明的是，无人称不是绝对的。有时由于行文等的需要，也使用人称代词。但总的来说，人称句在科技文章中的比例是很小的。

例如：One might therefore expect its electrical behavior to be similar to that of two junction diodes connected back-to-back.

也许因此有人认为它的电特性类似于两个背靠背连接的结型二极管。

二、语气正式（*Formal in speech*）

由于人们对待科技活动的态度向来十分严肃，所以科技文章在用词和语气上也较正式。

例如：It is a three-terminal device which exploits the properties of P-N junctions.

它是一种利用 P-N 结特性的三端器件。

By directivity is meant the ability of the microphone to pick up sounds from various directions.

所谓方向性，指的就是话筒从各个方向接受声音的能力。

在前一句例句中就使用了比较正式的书面用语 "exploit"，而没有使用较常见的一般用语 "use"。在后一句例句中则用了一个固定句式，即一个部分倒装句型，使语气显得比较正式。

三、陈述客观、准确（*Objective and accurate in statement*）

由于科技文章是反映客观事物的，所以对科技文章作者的基本要求就是在文章中不能掺杂个人的主观意识，对客观事物的陈述必须客观、准确。定性讨论客观、定量分析准确是科技文章的显著特征之一。

例如：In a wire through which an electric current flows, the electrical power that is changed into heat is commonly called the power loss in the wire, and the difference of potential across the terminals of the wire is called the voltage drop in the wire.

导线中电流流过时转变为热能的电功率通常称为导线的功耗，而导线两端的电势差称为导线的压降。

The farad is the capacitance of a capacitor with a potential difference of one volt when it is charged with a charge of one coulomb.

法拉是指当一个电容器两端电位差为 1 伏特且充有 1 库仑的电荷量时的电容值。

四、文体简洁（*Concise in stylistics*）

科技文章和文学作品的不同之处还在于其在语句的简洁。文学作品富于美学修辞，辞藻华丽，而科技文章则以交际修辞为主，文风质朴，语句长但文理清晰，强调语言的统一性和连贯性。

例如：The coil on which the current is impressed on the input side of the transformer is called the primary, while the one from which the induced current is obtained on the output side is called the secondary.

在变压器的输入端加上电流的线圈称为初级线圈，而在输出端获得感应电流的线圈称为次级线圈。

On account of the accuracy and ease with which resistance measurements may be made and well-known manner in which resistance varies with temperature, it is common to use this variation to indicate changes in temperature.

电阻的大小是随温度而变化的，用电阻进行测量既精确又方便，因此通常都用电阻的变化来表示温度的变化。

五、逻辑性强（*Strict in logic*）

科技文章的又一个突出的特征是逻辑性强。虽然逻辑是非语言因素，但能通过其来判断一篇科技文章是否具有科学性。科技文章的清晰概念，合理判断，严密推理等，都要求作者有很强的逻辑性来行文布局。

例如：The resistance of a wire is directly proportional to its length, inversely proportional to its cross-section, and directly proportional to the resistivity of the substance forming the wire.

导线的电阻与其长度成正比，与其横截面面积成反比，并且与组成导线的物质的电阻系数成正比。

Because the primary and secondary windings do not occupy exactly the same space, some of the flux that, links one winding does not link the other winding so that the e.m.f. per turn of the two windings are not exactly the same.

由于初级、次级绕组占据的空间并非完全相等，因此一绕组中有一部分磁通量并不穿过另一绕组，从而两绕组各匝的电动势也不完全相同。

六、专业术语性强（*Concentrated in technical terms*）

由于专业术语具有单义性和简洁性的特点，所以科技文章中有大量的专业术语，这是因为专业术语能使文章更加简洁、准确。对于科技人员来说，专业术语就是该专业的基础语言，而对于那些不从事该专业的人来说则很难理解。因此，科技文章的强专业术语性是区别一般性文章的重要特征。

例如：The most obvious advantage is that the oscilloscope shows waveform, frequency and phase simultaneously with the amplitude of the voltage (or current) being measured.

最显著的优点是示波器在测量电压（或电流）振幅值的同时显示出了波形、频率和相位。

MSC constitutes an interface between the radio system and the public switching telephone network (PSTN).

移动业务交换中心（MSC）形成了无线电系统与公共电话交换网（PSTN）之间的界面。

总而言之，在实际应用中，我们需要阅读大量科技英语方面的专业资料与文献。只有了解科技英语的这些特点，才能更好地理解科技文体，更准确地掌握行业最新科技动态。

Unit 2 Semiconductor

Technical terms:

1. integrated circuit (IC) 集成电路
2. N-type material N 型材料
3. P-type material P 型材料
4. forward bias 正向偏置
5. reverse bias 反向偏置
6. P-N junction P-N 结

Questions for text discussion:

1. Materials can usually be divided into three types, what are they?
2. Give some examples about semiconductor materials.
3. Describe the p-n junction electrical properties.

Text

All integrated circuits are made from semiconductors, substances whose ability to conduct electricity ranks between that of a conductor and that of a nonconductor, or insulator. Silicon is the most common semiconductor material. Because the electrical conductivity of a semiconductor can change according to the voltage applied to it, transistors made from semiconductors act like tiny switches that turn electrical current on and off in just a few nanoseconds (billionths of a second). This capability enables a computer to perform many millions of simple instructions each second and to complete complex tasks quickly.

The basic building block of most semiconductor devices is the diode, a junction of negative-type (n-type) and positive-type (p-type) materials. The terms n-type and p-type refer to semiconducting materials that have been doped—that is, that have had their electrical properties altered by the controlled addition of very small quantities of impurities such as boron or phosphorus .

In a diode, current flows in only one direction across the junction from the p- to n- type material, and then only when the p-type material is at a higher voltage than the n-type material. The voltage applied to the diode to create this condition is called the forward bias shown in Fig. 1. The opposite voltage, for which

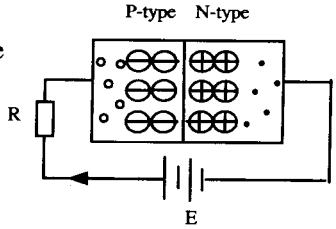

Fig.1 Forword bias