

应用型本科汽车类专业“十二五”规划教材

汽车专业英语

宋进桂 主编



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汽车专业英语

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本书共分4篇12章,内容包括汽车的一般知识(汽车的组成与分类等)、传统结构(发动机的分类、工作原理、主要部件和系统、底盘各系统和常规电气系统)和汽车新结构新技术(电控燃油喷射、汽油直喷、柴油机共轨喷油、各种自动变速器、轿车悬架、新型转向系统、空调、ABS、安全气囊、巡航、防盗系统等)等汽车基础知识以及汽车维护与修理、汽车销售与售后服务和汽车设计与制造方面的应用性内容。与同类教材相比,该教材更加具有针对性和实用性。本书可作为交通运输、汽车技术服务和车辆工程等汽车类应用型本科专业的教材,亦可作为工程技术人员的自学用书。

本书附带多媒体课件,提供所有课文的参考译文,可从机械工业出版社教材服务网(www.cmpedu.com)免费下载或拨打编辑热线获取(010-88379353)。

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丛 书 序

进入 21 世纪以来,我国高等教育得到了迅猛发展,已经进入了大众化的发展阶段,全国高等教育的毛入学率已达到 20%,上海、北京等高等教育发达地区的毛入学率已经超过 50%,率先进入了高等教育大众化的发展阶段。

在高等教育大众化发展阶段,受教育者和社会对高等学校的要求趋向于多元化和复杂化,对人才的认识和评价标准趋向于多样化,它的发展必然要求高等教育理念、办学形式的多元化和高等学校办学层次、类型的多样化。我国传统的“精英式”高等教育理念、“研究型”高等学校办学模式和“学术性”人才培养模式在高等教育大众化阶段受到了严重挑战。也就是说,高等教育大众化在提高适龄青年接受高等教育比例的同时,使教育的对象、目标和教育结构发生了变化,接受高等教育的人具有了不同的类型和不同的特点,这就需要高等教育具有不同层次和不同类型,因此,产生了学校设置的不同类型和不同定位。应用型本科人才的培养正是在这种情况下越来越得到社会的重视。

为适应社会对应用型人才的需求,对高等学校尤其是新建本科院校来说,应用型本科人才的培养工作重任在肩。应用型本科如何定位、分类和发展,是国内教育界非常关注的问题。定位于职业取向的应用型大学,既有普通本科教育的共性,又有区别于普通本科的自身特点,它更加注重的是实践性、应用性和技术性。有人认为,“后劲足、上手快”,即基础知识比高职高专学生深厚,实践能力比传统本科生强,是本科应用型人才最本质的特征,但是由于类型多而复杂,应用型本科院校之间缺乏横向交流和适用于应用型人才培养的针对性教材一直是制约院校发展的瓶颈。

2011 年 12 月,围绕应用型本科人才培养和教材开发,机械工业出版社牵头在上海建桥学院召开了“汽车类专业应用型本科示范教材”开发研讨会。上海建桥学院、上海电机学院、鲁东大学、九江学院、长安大学、河南科技大学、南昌工程学院、黑龙江工程学院、武汉科技大学、山东交通学院、河南工业大学、长春工业大学、哈尔滨理工大学、沈阳理工大学、浙江师范大学、吉林农业大学、金陵科技学院等来自全国 20 多所设有汽车类专业的应用型本科院校的 30 多位汽车专业系主任和骨干教师参加了此次会议。此次会议组建成立了“全国汽车类专业应用型本科院校联盟”,审议并通过了“全国汽车类专业应用型本科院校联盟”章程和联盟理事会工作细则,确定了教材联编共同的思路。

在此次会议上,与会代表对汽车类专业应用型本科的培养方案、专业建设、教材建设等问题进行了深入而广泛的探讨,并成立了教材编审专家委员会,对教材编例、内容组织、教材体系等多方面问题进行了探讨。

本套教材具有如下特点:

- 强调以知识为基础,以能力为重点,知识、能力、素质协调发展,具体培养目标强调学生综合素质和专业核心能力的培养。
- 内容组织和体现形式符合学生认知和技能养成规律,体现以应用为主线。
- 体现行业需求、职业要求和岗位规范,尤其是要注意紧跟技术更新。

- 注重对学生分析能力、判断能力、创新能力和沟通能力的综合能力培养。
- 配套开发了课程设计指导和实训教学指导书，配备多媒体教学课件，打造立体化教材。

本套教材附赠多媒体课件、练习题答案等教学资料供任课老师采用，可在机械工业出版社教材服务网（www.cmpedu.com）免费下载或拨打编辑热线获取（010-88379353）。

虽然本套教材的各参编院校在应用型本科人才培养和教学改革方面进行了有益的探索，但限于认识水平和工作经历，教材中难免仍有许多不足之处，恳请各位专家、同行和广大使用本套教材的师生给予批评指正。

应用型本科汽车类专业“十二五”规划教材编委会

前 言

本书内容紧紧围绕培养应用型汽车类专业人才这个中心,将汽车结构基础与应用有机结合,介绍了汽车的一般知识(汽车的组成与分类等)、传统结构(发动机的分类、工作原理、主要部件和系统、底盘各系统和常规电气系统)和汽车新结构新技术(电控燃油喷射、汽油直喷、柴油机共轨喷油、各种自动变速器、轿车悬架、新型转向系统、空调、ABS、安全气囊、巡航、防盗系统等)。

在介绍汽车结构的基础上,编者根据交通运输、汽车服务工程和车辆工程等汽车类本科专业的特点,编入了汽车维护与修理、汽车销售与售后服务以及汽车设计与制造方面的应用性内容。与同类教材相比,本教材更加具有针对性和实用性。

为了方便学习,书末列出了常用汽车专业英语缩写、常用汽车专业术语和汽车配置英语。在本教材编写过程中,突出以下主要理念:

(1) 以掌握汽车专业英语基础知识为根本,以训练汽车英语应用能力为主线,以适应社会和职业需求为目标。

(2) 按照学生认识规律进行教材设计,将教材的系统性、科学性与前瞻性相结合。

为适应教学需要,将每篇课文的生词与词组放在了最前面。课文中涉及的主要专业术语用黑体字加以强调。

本教材适宜学时数为 28~38 学时,每章参考教学学时数列表如下:

篇名/建议学时	章 名	建议学时
Section 1 Automotive Basics/26	Chapter 1 General Information	2
	Chapter 2 Internal Combustion Engine	10
	Chapter 3 Power Train	4
	Chapter 4 Steering and Suspension System	2
	Chapter 5 Braking System	2
	Chapter 6 Automotive Electrical and Electronic System	6
Section 2 Automotive Maintenance and Repair/12	Chapter 7 Common Special Service Tool and Equipment	6
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Section 3 Automotive Marketing and Service/12	Chapter 9 Car Marketing	6
	Chapter 10 Aftermarket Service	6
Section 4 Automotive Design and Manufacturing/12	Chapter 11 Automotive Design	6
	Chapter 12 Automotive Manufacturing	6

使用者可根据本校所开设的专业和培养目标以及学生实际情况选学部分内容。Section 1 是汽车类各专业的公共基础部分,建议各专业均选学。另建议交通运输专业选学

Section 2, 汽车技术服务专业选学 Section 3, 车辆工程专业选学 Section 4。

本书中的许多课文选自近年出版的英文书刊, 附带的多媒体课件提供了大量的彩图, 同时为了方便自学, 还提供了所有课文的参考译文。配套的电子课件和参考译文可以到 www.cmpedu.com 免费下载。

本书由宋进桂任主编, 冯莉、丁志华任副主编, 戚基艳、杨玉炎、粘洪昆、周建勋、姜革参与了编写。具体任务分工为: 冯莉编写 2.10~2.12 节和 3.1~3.4 节, 丁志华编写 5.1~5.4 节, 戚基艳编写 9.1~9.4 节, 宋进桂、杨玉炎、粘洪昆、周建勋、姜革编写其余部分。由于编者水平有限, 书中必定存在不当和错误之处, 敬请使用者提出批评意见。

本书的出版得到了机械工业出版社汽车分社的大力支持, 编辑们不辞辛苦, 对文字和格式进行了反复加工。鲁东大学、沈阳理工大学和九江学院等高等学校对本书的编写亦给予了极大的支持。全体编者对上述为本书顺利出版提供支持和帮助的单位和个人以及参考文献的作者表示诚挚的谢意。

编者

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Chapter 1	Section 2	Automotive Market
Chapter 1	Section 3	Automotive Technology
Chapter 2	Section 1	Automotive Powertrain
Chapter 2	Section 2	Automotive Chassis
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Chapter 2	Section 4	Automotive Electrical System
Chapter 3	Section 1	Automotive Maintenance
Chapter 3	Section 2	Automotive Repair
Chapter 3	Section 3	Automotive Safety
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Chapter 3	Section 5	Automotive Noise and Vibration
Chapter 3	Section 6	Automotive Ergonomics
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Section 1

Automotive Basics

第一篇 汽车基础

Chapter 1 General Information 一般知识

1.1 Basic Parts of Automobile 汽车的基本组成

1.1.1 New Words and Phrases

category	['kætɪgəri]	n. 种类, 类型, 范畴
manifold	['mæniʃəuld]	a. 多种形式的, 多方面的; n. 歧管
styling	['stailɪŋ]	n. 花 [式] 样
streamlined	['stri:mleɪnd]	a. 流线型的, 现代化的
chassis	['ʃæsi]	n. 底盘
coolant	['ku:lənt]	n. 冷却液, 冷却剂
lubrication	[,lu:bri'keɪʃən]	n. 润滑
ignition	[ig'niʃən]	n. 点火, 点燃
ignite	[ig'nait]	v. 点火, 点燃
carburetor	['kɑ:bjʊretə]	n. 化油器
combustible	[kəm'bʌstəbl]	a. 易燃的
axle	['æksl]	n. 轮轴, 车轴
suspension	[səs'penʃən]	n. 悬架, 悬浮, 悬浮液, 暂停, 中止, 悬而未决
differential	[difə'renʃəl]	n. 差速器, 微分; a. 微分的, 差动的
transmission	[træn'smiʃən]	n. 变速器, 传动, 传动系统, 传送, 发射
clutch	[klʌtʃ]	n. 离合器
hydraulic	[hai'drɔ:lik]	a. 液压的, 水压的, 水力的
manoeuvre	[mən'u:və]	= manoeuvre v. 策划, 机动; n. 策略, 调动
drum	[drʌm]	n. 鼓, 鼓声; v. 击鼓
pedal	['pedl]	n. 踏板
power unit		动力装置
gasoline engine		汽油机
spark - ignition engine		点燃式发动机
diesel engine		柴油机
compression - ignition engine		压燃式发动机

combustible mixture	可燃混合气
motor oil	= engine oil 发动机油
wind resistance	空气阻力, 风阻
driving speed	行驶速度
power train	传动系, 动力装置
propeller shaft	传动轴
rear axle	后桥
driving road wheel	驱动轮
torque converter	液力变矩器
drive shaft	传动轴

1. 1. 2 Text

Today's average car contains more than 15,000 separate, individual parts that must work together. These parts can be grouped into four major categories: engine, body, chassis and electrical equipment (Figure 1 - 1).

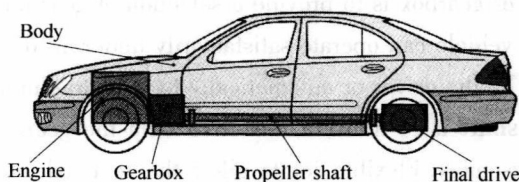


Figure 1 - 1 Basic parts of a car

1. Engine

The engine acts as the **power unit**. There are two types of engine: **gasoline engine** (also called a **spark - ignition engine**) and **diesel engine** (also called a **compression - ignition engine**).

All engines have fuel, exhaust, cooling, and lubrication systems. Gasoline engines also have an ignition system. The ignition system supplies the electric spark needed to ignite the air - fuel mixture in the cylinders. The fuel system stores liquid fuel and delivers it to the engine. The fuel is mixed with air to form a **combustible mixture** in the carburetor, the manifold, or the cylinders themselves. The cooling system removes excessive heat from the engine. Air and a coolant are used to carry away the heat. The lubrication system is important in keeping the engine running smoothly. **Motor oil** is the lubricant used in the system.

2. Body

An automobile body (Figure 1 - 2) provides a protective covering for the engine, passengers, and cargo. The body is designed to keep passengers safe and comfortable. The body styling provides an attractive, colorful, modern appearance for the vehicle. It is streamlined to lessen wind resistance and to keep the car from swaying at the driving speeds.

3. Chassis

The chassis includes the power train, suspension, steering, and brake systems.

The **power train** system comprises the **clutch, transmission, propeller shaft, rear axle**

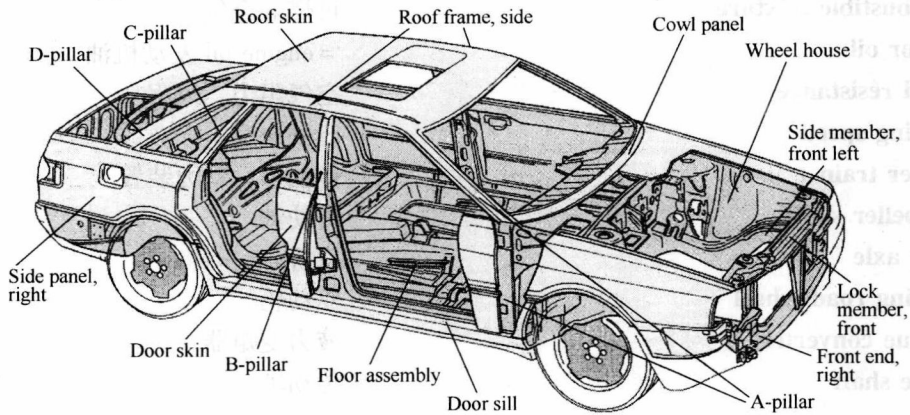


Figure 1 - 2 An automobile body

and **differential** and the **driving road wheels**. The clutch or torque converter has the task of disconnecting and connecting the engine's power from and to the driving wheels of the vehicle. The main purpose of the transmission or gearbox is to provide a selection of gear ratios between the engine and driving wheels, so that the vehicle can operate satisfactorily under all driving conditions. Gear selection may be done manually by the driver or automatically by a hydraulic control system. The function of the **propeller (drive) shaft** is to transmit the drive from the gearbox to the input shaft of the rear axle and differential assembly. Flexible joints allow the rear axle and wheels to move up and down without affecting operation. The rear axle and differential unit transmits the engine's rotational power from propeller shaft to axle shaft to road wheels. A further function is to allow each driving wheel to turn at a different speed when cornering. A third function is to introduce another gear ratio for torque multiplication.

The basic job of the **suspension system** is to absorb the shocks caused by irregular road surfaces that would otherwise be transmitted to the vehicle and its occupants, thus helping to keep the vehicle on a controlled and level course, regardless of road conditions.

The **steering system** provides the means by which the front wheels are directionally turned. The steering system may be power assisted to reduce the effort required to turn the steering wheel and make the vehicle easier to manoeuvre.

The **braking system** on a vehicle has three main functions. It must be able to reduce the speed of the vehicle, when necessary; it must be able to stop the car in as short a distance as possible; it must be able to hold the vehicle stationary. Each wheel has a brake assembly, of either the drum type or the disc type, hydraulically operated when the driver applies the foot brake pedal.

4. Electrical equipment

The electrical system supplies electricity for the ignition, horn, lights, heater, and starter. The electricity level is maintained by a charging circuit. This circuit consists of a battery, and an alternator (or generator). The battery stores electricity. The alternator changes the engine's mechanical energy into electrical energy and recharges the battery.

1.2 Classification of Automobile 汽车的分类

1.2.1 New Words and Phrases

sedan	[si'dæn]	n. 轿车, 轿子
enclosed	[in'kləuzd]	a. 封闭的, 密闭的
pick - up	['pikʌp]	n. 拾波器, 轻型货车 (皮卡), 传感器
gross	[grəʊs]	a. 总的, 毛重的; n. 总额
coach	[kəʊtʃ]	n. 四轮大马车, 长途客车, 教练
rigid	['rɪdʒɪd]	a. 刚硬的, 刚性的, 严格的
articulated	[ɑ:'tɪkjuleɪtɪd]	a. 铰接 (的), 有关节 (的)
capacity	[kə'pæsɪtɪ]	n. 容量, 生产量, 才能, 能力
commuter	[kə'mju:tə]	n. 长期月票使用者
luxurious	[lʌg'ʒʊəriəs]	a. 奢侈的, 豪华的
passenger car		乘用车
commercial vehicle		商用车
multi - purpose van (MPV)		多用途厢式车

1.2.2 Text

Motor vehicles can be classified depending on the following features:

1. Uses of vehicle

Motor vehicles can be divided into **passenger cars** and **commercial vehicles**. Passenger cars are primarily intended for use in transporting people, as well as their luggage and other small cargo. The number of seats, including that of the driver, is restricted to nine. Commercial vehicles are designed to transport people and cargo and for pulling trailers (Figure 1 - 3).

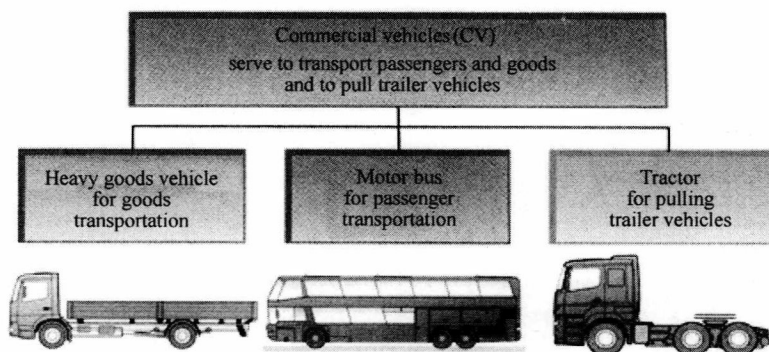


Figure 1 - 3 Commercial vehicles

2. Body shapes

A sedan has an enclosed body with a maximum of 4 doors to allow access to the passenger compartment. The design also allows for storage of luggage or other goods. A sedan can also be referred to as a saloon and traditionally has a fixed roof. There are soft-top versions of the same body design except for having 2 doors, and these are commonly referred to as **convertibles** (Figure 1-4). **Multi-purpose vans (MPV)** can be based on common sedan designs or redesigns so that maximum cargo space is available. The **pick-up** carries goods. Usually it has stronger chassis components and suspension than a sedan to support greater gross vehicle mass. The bodies of commercial vehicles that transport goods are designed for that specific purpose. **Buses** and **coaches** are usually 4-wheel rigid vehicles, but a large number of wheels and axles can be used. Sometimes articulated buses are used to increase capacity. Buses and coaches can be single-deck or double-deck. Buses are commonly used in cities as commuter transports while coaches are more luxurious and used for long distances.



Figure 1-4 Body shapes

Chapter 2 Internal Combustion Engine 内燃机

2.1 Principle of Operation 工作原理

2.1.1 New Words and Phrases

Nicolaus August Otto		尼古拉斯·奥古斯特·奥托
Cologne	[kə'ləun]	n. 科隆 (德国城市)
Deutz		道依茨
Gottlieb Daimler		戈特利布·戴姆勒
associate	[ə'səʊʃieit]	n. 伙伴, 同事, 合伙人
pioneer	[paɪə'niə]	n. 拓荒者, 先驱者, 开拓者 v. 开辟, 倡导
combustion	[kəm'bʌsʃən]	n. 燃烧
stroke	[strəʊk]	n. 冲程, 行程
piston	['pɪstən]	n. 活塞
cylinder	['sɪlɪndə]	n. 气缸
valve	[vælv]	n. 气门, 阀门, 阀
exhaust	[ɪg'zɔ:st]	n. 排气, 废气
intake	['ɪnteɪk]	n. 进气, 进 (引, 吸) 入
compression	[kəm'preʃən]	n. 压缩
crankshaft	['kræŋkʃɑ:ft]	n. 曲轴
charge	[tʃɑ:dʒ]	n. 充气, 充量, 充电; v. 充电, 增压
descend	[di'send]	v. 下来, 下降, 下倾, 下斜, 下行
ascend	[ə'send]	v. 登高, 上升, 上行
aspire	['æspəreɪt]	v. 吸气, 抽吸
throttle	['θrɒtl]	n. 节气门, 节流阀, 油门, 风门
depression	[di'preʃən]	n. 萧条 (期), 凹地, 洼地, 低 (气) 压
atomise	['ætəmaɪz]	v. 使雾化, 喷雾, 粉化
innermost	['ɪnəməʊst]	a. 最内的, 最内部的, 最深处的, 内心深处的
outermost	['aʊtəməʊst]	a. 最外边的, 离中心最远的
maybe	['meɪbi]	ad. 大概, 或许, 可能