



21世纪高职高专专业英语系列教材

数控

专业英语

第2版

• 吴凤仙 主编

Numerical Control English



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21世纪高职高专专业英语系列教材

数控专业英语

第2版

主 编 吴凤仙

副主编 李春兰

审 稿 辛 凌 刘国正

编 委 吴凤仙 李春兰 肖练武 耿保荃 肖兆武 张映辉



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数控技术已经成为机械工程类专业学生的重要技术基础课程之一。随着数控技术的迅速提高,世界上一些发达国家的制造业大量转向中国,国外大批制造业专家以及先进技术装备也已涌入中国,专业人士需要阅读大量的原版英文技术资料,因此专业技术英语的学习和提高越来越重要,对我国学习机械专业和数控技术专业的学生来说,学习专业英语已经非常的迫切和必要。另外,目前的英语课学习几乎一直是独立于其他科目之外的特殊课程,必须与工作和专业联系起来,才显得尤为重要。

编者根据高等职业教育数控技术应用专业领域技能型紧缺人才的培养目标,从高职教育和知识应用的实际出发,结合专业英语的教学实践编写了该教材,学生在具备了一定的数控专业知识的基础上,通过大量阅读与本专业有关的英文文章,获得专业英语阅读理解能力,从而促进对数控知识的理解和掌握。

本教材为修订本,全书由 11 个单元组成,介绍了数控概念、数控机床、数控车床、数控车床操作、数控车床编程技术、数控车床编程、数控机床的伺服驱动系统、数控加工中心、数控机床操作、数控铣削加工工艺以及电火花加工等方面的知识。

本书主要体现以下几个特点:

1. 内容具有实用性和先进性。介绍了数控技术领域的最新技术和知识。
2. 图文并茂。大多数单元都配有与内容相关的插图,更直观、易于理解,即通过文中图例便可猜出各段文章大意,有利于专业英语的学习。
3. 生词加注音标。每篇课文后都安排有专业词汇和专业术语,并注出读音便于学生正确朗读和理解。
4. 习题内容丰富,题型多样。

5. 每篇课文后有词汇、短语、注释和句子结构分析,书后附有参考译文及习题参考答案。

6. 本书还配有录音光盘和教学课件,其目的是让广大学生学习和巩固数控基础知识。

本书在编写过程中,得到了襄樊学院刘国正、鄂纺机电学校刘自力、襄轴高级工程师杨凤鸣的大力支持,并提出了宝贵的意见,在此一并表示感谢。

编者

2012年5月

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E-mail: 929350997@qq.com



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CONTENTS

Unit 1 What Is CNC 数控概念	1
Lesson 1 How CNC Works and Motion Control	
CNC 的工作原理和运动控制	1
1. How CNC Works CNC 的工作原理	1
2. Motion Control 运动控制	1
Lesson 2 Programmable Accessories and the CNC Program	
可编程附件和 CNC 程序	3
1. Programmable Accessories 可编程附件	3
2. The CNC Program CNC 程序	3
Lesson 3 The CNC Control and What Is a CAM System	
CNC 控制器和 CAM 系统	4
1. The CNC Control CNC 控制器(数控系统)	4
2. What Is a CAM System CAM 系统	5
Lesson 4 What Is a DNC System DNC 系统	6
Unit 2 Numerical Control Machine 数控机床	9
Lesson 1 Creation and Development of NC Machine	
数控机床的产生和发展	9
1. NC Stage (1952-1970) 数控(NC)阶段(1952—1970 年)	9
2. CNC Stage (1970-) 计算机数控(CNC)阶段(1970 年—现在)	10
Lesson 2 The Types of NC Machine 数控机床的类型	11
Lesson 3 Components of NC Machine 数控机床的组成	13
Lesson 4 Principle of Working for NC Machine 数控机床的工作原理	15

Lesson 5	Components and Accessories of NC Machine	
	数控机床的组件和附件	17
1.	Components 组件	17
2.	Accessories 附件	18
Lesson 6	Key Points of Learning about NC Machine	
	学习数控机床的要点	19
Unit 3	Numerical Control Lathe 数控车床	23
Lesson 1	Brief Introduction to NC Lathe 数控机床简介	23
1.	Purpose of NC Lathe 数控车床用途	23
2.	Conventional Cutter and Fixture of NC Lathe 数控车床常用刀具与夹具	23
3.	NC Lathe Tool Compensation 数控车床对刀	24
Lesson 2	Components of Modern NC Lathe 现代数控车床的组成	26
Lesson 3	NC Lathe Axes of Motion 数控车床的运动轴	30
Lesson 4	Conventional Fixture Types of NC Lathe 数控车床常用夹具类型	31
1.	Circumferential Location Fixture 圆周定位夹具	31
2.	Other Cutting Fixtures 其他车削工装夹具	33
Unit 4	NC Lathe Operation 数控车床操作	39
Lesson 1	Basic NC Lathe Operation 基本车床操作	39
1.	Facing 端面车削	39
2.	Turning 外圆车削	39
3.	Grooving 切槽	40
4.	Parting 切断	40
5.	Drilling 钻孔	41
6.	Boring 镗削加工	41
7.	Threading 螺纹车削	42
Lesson 2	NC Lathe Operation Procedure 数控车床操作步骤	44
1.	Inspection for NC Lathe before and after It's Powered on 电源接通前后的检查	44
2.	Manual Operation Machine 手动操作机床	45
3.	Emergency Stop of Machine 机床的急停	46

4. Input, Inspection and Alteration of Program	
程序的输入、检查和修改	46
5. Input Tool Compensation Value 刀具补偿值的输入	46
6. The Working of Machine 机床的运转	46
7. Attention of NC Machining Operation 数控车床加工操作注意事项 ...	47

Unit 5 Techniques for NC Lathe Programming

数控车床编程技术	51
Lesson 1 Tool Edge Programming 刀缘编程法	51
Lesson 2 Setting up Tool Nose Radius Compensation 建立刀尖半径补偿	52
Lesson 3 Some Restrictions with Tool Nose Radius Compensation	
刀尖半径补偿的一些要求	53
Lesson 4 Tool Nose Radius Compensation Command	
刀尖的半径补偿指令	55

Unit 6 NC Lathe Programming 数控车床编程

Lesson 1 The Characteristics of NC Lathe Programming	
数控车床编程特点	59
1. Coordinate System 加工坐标系	59
2. Diameter Specification and Radius Specification	
直径指定和半径指定	60
3. Feed and Retraction 进刀和退刀	60
4. The Functions of Tool Compensation 刀具补偿功能	61
5. Preparatory Function (G code) for Lathes 数控车床准备功能	61
6. Reference Point, Machining Origin, and Program Origin	
参考点、加工原点和编程原点	62
7. Important Miscellaneous Functions (M codes)	
重要的车床辅助功能	63
Lesson 2 Types of Tool Positioning Modes 刀具定位模式类型	66
1. Absolute Positioning 绝对定位	66
2. Incremental Positioning 相对定位	66
3. Diameter Programming 直径编程	67
4. Radius Programming 半径编程	67

Lesson 3	Interpolation Commands (CNC Lathe) 插补指令(数控车床)	69
1.	Linear Interpolation Commands 直线插补指令	69
2.	Circular Interpolation Commands 圆弧插补指令	69
Unit 7 Servo-Drive System of NC Machine Tools		
	数控机床的伺服驱动系统	75
Lesson 1	Basic Concept of Servo-Drive System 伺服驱动系统的基本概念	75
Lesson 2	Basic Requirement for Servo-Drive System	
	伺服驱动系统的基本要求	77
1.	Reversible Operation 可逆运行	77
2.	Enough Range of Speed Adjustment 进给调速范围要宽	78
3.	Fastness Response and Speed Stability 快速响应和速度稳定性	78
4.	High Degree of Precision 高精度	78
Lesson 3	Open-Loop Feed Servo System 开环进给伺服系统	80
1.	Step Motor 步进电动机	81
2.	Drive Control of Step Motor 步进电动机的驱动控制	81
Lesson 4	Closed-Loop Servo System 闭环伺服系统	83
1.	Direct-Current Servo Motor Control 直流伺服电动机	83
2.	Alternating Current Servo Motor Control 交流伺服电动机	84
Unit 8 NC Machining Centers 数控加工中心		
Lesson 1	Introduction to NC Machining Centers 数控加工中心简介	89
Lesson 2	Background on NC Machining Centers 数控加工中心背景	91
Lesson 3	Basic Operation of NC Machining Centers	
	数控加工中心的基本操作	93
1.	Manual Operation of Machining Centers 加工中心的手动操作	93
2.	Program Input 程序输入	93
3.	Tool Compensation 刀具补偿	94
Unit 9 NC Machine Operation 数控机床操作		
Lesson 1	NC Machine Operation Panel 数控机床操作面板	99
1.	Emergency Stop 急停	99
2.	Mode Select 模式选择	100
3.	Edit 编辑	100

4. Memory 存储	100
5. Manual Data Input (MDI) 人工数据输入	100
6. Handle 手动	101
7. Jog 点动进给	101
8. Cycle Start 循环启动	101
9. Feed Hold 进给保持	101
10. Single Block 单程序段	101
11. Dry Run 空运行	102
12. Reference Return 零点返回	102
13. Machine Lock 机床锁定	102
14. Control Panel 控制面板	102
15. Power On and Power Off 电源开和关	102
16. Reset 复位	102
Lesson 2 Operation Requirement for NC Machine 数控机床操作要求	104
Lesson 3 Maintenance of NC Machine 数控机床的维护与保养	106
Lesson 4 Troubleshooting of NC Machine 数控机床故障查找	109
1. Direct-Vision 直观法	109
2. Alarm Function 报警功能法	110
3. Functional Program Test 功能程序测试法	110
4. Replacing Parts 备件置换法	110
5. Checking Parameters 参数检查法	110
6. Principle Analysis 原理分析法	110
Unit 10 NC Milling Machining Process 数控铣削加工工艺	113
Lesson 1 The Main Contents of NC Milling Machining Process 数控铣削加工工艺的主要内容	113
Lesson 2 The Selection of NC Milling Cutter 数控铣削刀具的选择	114
1. The Factors to Be Considered about Selecting NC Cutters 选择数控刀具应该考虑的因素	114
2. Selection of Boring Milling System Cutter of NC Millers 数控铣床镗铣削系统刀具的选择	114
3. Selection of Milling Cutter Types 铣刀类型的选择	115
4. Selection of Milling Cutter Parameter 铣刀参数的选择	116
5. Definition of the Cutter Length Size 刀具长度尺寸的确定	117

Lesson 3	NC Milling Common Clamp and Mount	
	数控铣床通用夹具与安装	119
1.	Machine Vice 机用虎钳	119
2.	Three-jaw Chuck 三爪卡盘	120
3.	Disk Worktable 圆盘工作台	121
4.	Mounting Workpieces on the Miller Worktable Directly 直接在铣床工作台上的安装	121
5.	Using Angle Iron and V Form Iron to Clamp Workpiece 利用角铁和 V 形铁装夹工件	122
6.	Using Special Clamp to Hold Workpieces 专业夹具装夹工件	122
7.	Using Assembled Clamp to Hold Workpieces 组合夹具装夹工件	122
8.	Using Index Head to Clamp Workpieces 分度头装夹工作	123
Lesson 4	Part Positioning Base and Clamp When NC Milling	
	数控铣削时零件的定位基准与装夹	125
1.	Positioning Base 定位基准	125
2.	Clamping 装夹	125
Unit 11	Electrical Discharge Machining 电火花加工	131
Lesson 1	The Brief Introduction to Electrical Discharge Machining	
	电火花加工简介	131
Lesson 2	NC WEDM Machine Tool 数控电火花线切割机床	134
1.	The Basic Principle of WEDM 电火花切割加工的基本原理	134
2.	The Component of NC Wire Cutting Machine Tool 数控线切割机床的组成	134
Lesson 3	NC Electric Discharge Shaped Machine 数控电火花成型机床	138
1.	The Shaped Machining Principle of Electric Discharge 电火花成型加工原理	138
2.	NC Electric Discharge Shaped Machining Machine 电火花成型加工机床	139
附录一	词汇表	145
附录二	参考译文	157
附录三	参考答案	195
参考文献		205

Unit 1

What Is CNC

数控概念

CNC stands for Computerized Numerical Control and has been around since the early 1970s. Prior to this, it was called NC, for numerical control. While people in most walks of life have never heard of this term, CNC has touched almost every form of manufacturing process in one way or another. If you'll be working in manufacturing, it's likely that you'll be dealing with CNC on a regular basis.

► Lesson 1 How CNC Works and Motion Control CNC的工作原理和运动控制

1. How CNC Works CNC 的工作原理

As you might already have guessed, everything that an operator would be required to do with conventional machine tools is programmable with CNC machines. ^① Once the machine is setup and running, a CNC machine is quite simple to keep running. In fact CNC operators tend to get quite bored during lengthy production runs because there is no little to do. With some CNC machines, even the workpiece loading process has been automated.

2. Motion Control 运动控制

All CNC machine types share this commonality: They all have two or more programmable directions of motion called axes. An axis of motion can be linear (along a straight line) or rotary (along a circular path). One of the first specifications that imply a CNC machine's complexity is how many axes it has. Generally speaking, the more axes, the more complex the machine. ^②

The axes of any CNC machine are required for purpose of causing the motions needed for the manufacturing process. In the drilling example, these (3) axes would

position the tool over the hole to be machined (in two axes) and machine the hole (with the third axis). Axes are named with letters. Common linear axis names are X, Y, and Z. Common rotary axis names are A, B, and C. These are related to the coordinate system. ^③ See Fig. 1-1

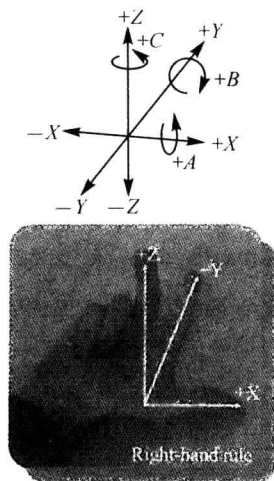


Fig. 1-1 Coordinate system

◎ New Words:

computer	[kəm'pjʊ:tə]	n.	计算机, 电脑
regular	['regjʊlə]	adj.	有规律的
coordinate	[kəu'ɔ:dɪnət]	n.	坐标

◎ Phrases:

generally speaking	一般来说
related to	与……有关
coordinate system	坐标系

◎ Notes:

1. As you might already have guessed, everything that an operator would be required to do with conventional machine tools is programmable with CNC machines.

也许你已经做出猜想:普通机床需要操作员做的每一项工作,在数控机床上都是由程序控制的。

句中“*As you might already have guessed,*”为状语从句表示原因。

2. The more axes, the more complex the machine.

This means the axes the machine has, the more complex the machine is.

轴数越多,机床越复杂。

3. Common linear axis names are X, Y, and Z. Common rotary axis names are A, B, and C. These are related to the coordinate system.

常用的直线轴名称为 X, Y, Z, 常用的旋转轴名称为 A, B, C, 它们与坐标系相关。

▶ Lesson 2 Programmable Accessories and the CNC Program 可编程附件和CNC程序

1. Programmable Accessories 可编程附件

A CNC machine would not be very helpful if all it could only move the workpiece in two or more axes. Almost all CNC machines are programmable in several other ways. The specific CNC machine type has a lot to do with its appropriate programmable accessories. Again, any required function will be programmable on full-blown CNC machine tools.

2. The CNC Program CNC 程序

Think of giving any series of step-by-step instructions. A CNC program is nothing more than another kind of instruction set. It's written in sentence-like format and the control will execute it in sequential order, step by step.

A special series of CNC *words* are used to communicate what the machine is intended to do. CNC words begin with letter addresses (like F for feed rate, S for spindle speed, and X, Y & Z for axis motion). When placed together in a logical method, a group of CNC words make up a command that resemble a sentence.

◎ New Words:

axis	['æksis]	<i>n.</i>	轴
accessory	[ək 'sesəri]	<i>n.</i>	附件
helpful	['helpfl]	<i>adj.</i>	有帮助的

resemble

[ri'zembl]

v.

类似, 像

◎ Phrases:

On full-blown CNC machine tool

在全功能数控机床上

▶ Lesson 3 The CNC Control and What Is a CAM System CNC控制器和CAM系统

1. The CNC Control CNC 控制器(数控系统)

The CNC control (refer to Fig. 1-2) will interpret a CNC program and activate the series of commands in sequential order. As it reads the program, the CNC control will activate the appropriate machine functions, cause axis motion, and in general, follow the instructions given in the program. ①

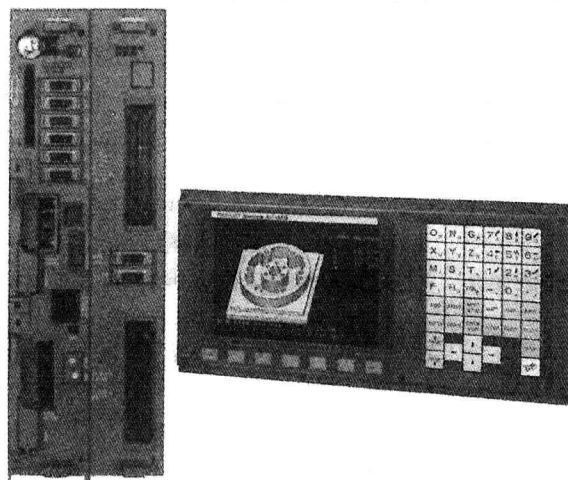


Fig. 1-2 CNC control

Among with interpreting the CNC program, the CNC control has several other purposes. All current model CNC controls allow programs to be modified (edited) if mistakes are found. The CNC control allows special verification functions (like dry run) to confirm the correctness of the CNC program, like tool length values. In general, the CNC control allows all functions of the machine to be manipulated. ②

2. What Is a CAM System CAM 系统

As applications get more complicated, and especially when new programs are required on a regular basis, writing programs manually becomes much more difficult. To simplify the programming process, a computer aided manufacturing (CAM) system can be used.^③ A CAM system is a software program that runs on a computer (commonly a PC) that helps the CNC programmer with the programming process. Generally speaking, a CAM system will take the tediousness and drudgery out of programming.

In many companies the CAM system will work with the computer aided design (CAD) drawing developed by the company's design engineering department. This eliminates the need for redefining the workpiece configuration to the CAM system. The CNC programmer will simply specify the machining operations to be performed and the CAM system will create the CNC program.^④

◎ New Words:

activate	['æktiveit]	v.	激活,使活动
modify	['mɒdfai]	v.	修改,更改
verification	[,verifi'keɪʃn]	n.	确认,核实
simplify	['simplifai]	v.	使简化
tediousness	['ti:diəsnis]	n.	沉闷,乏味
drudgery	['drʌdʒəri]	n.	苦工,苦差事
eliminate	['ɪlɪmineɪt]	v.	消除,排除
redefine	['ri:di'fain]	v.	重新定义
configuration	[kənɪfɪgə'reɪʃn]	n.	配置,结构
specify	['spesɪfai]	v.	指定,详细说明

◎ Phrases:

dry run 空运行

◎ Notes:

1. As it reads the program, the CNC control will activate the appropriate machine functions, cause axis motion, and in general, follow the instructions given in the program.

数控系统阅读程序时,会激活相应的机床功能,产生轴运动,总而言之,遵照执