

1 Machining Center Programming, Setup, & Operation

24 Lessons

Lesson	Min.	Description
Lesson 1	30	Machine configurations
Lesson 2	15	General flow of programming
Lesson 3	30	Visualizing program execution
Lesson 4	30	Understanding program zero
Lesson 5	30	Measuring the program zero point
Lesson 6	30	Two ways to assign program zero
Lesson 7	30	Introduction to programming words
Lesson 8	30	Preparation for programming
Lesson 9	60	Three kinds of motion commands
Lesson 10	20	Introduction to compensation
Lesson 11	50	Tool length compensation
Lesson 12	50	Cutter radius compensation
Lesson 13	40	Fixture offsets
Lesson 14	30	Introduction to program formatting
Lesson 15	40	The four kinds of program format
Lesson 16	70	Canned Cycles
Lesson 17	40	Subprogramming techniques
Lesson 18	40	Other special features
Lesson 19	40	Rotary devices
Lesson 20	30	The Fanuc control panel
Lesson 21	30	The Machine panel
Lesson 22	25	The three modes of operation
Lesson 23	40	The key sequences of operation
Lesson 24	40	Program verification techniques



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2 Turning Center Programming, Setup, & Operation

28 Lessons

Lesson	Min.	Description
Lesson 1	20	Machine configurations
Lesson 2	20	Spreads and feeds
Lesson 3	20	Visualizing program execution
Lesson 4	10	Flow of programming process
Lesson 5	22	Understanding program zero
Lesson 6	20	Two ways to assign program zero
Lesson 7	18	Assigning program zero
Lesson 8	20	Introduction to programming words
Lesson 9	20	Preparation for programming
Lesson 10	20	Types of motion
Lesson 11	16	Introduction to compensation
Lesson 12	20	Dimensional tool offsets
Lesson 13	20	Geometry offsets
Lesson 14	20	Tool nose radius compensation
Lesson 15	20	Program formatting
Lesson 16	20	The four kinds of program format
Lesson 17	20	Simple canned cycles
Lesson 18	20	Multiple repetitive cycle (roughing)
Lesson 19	20	More multiple repetitive cycles (G72-G75)
Lesson 20	20	Threading multiple rep. cycle (G76)
Lesson 21	20	Subprogramming techniques
Lesson 22	16	Control model differences
Lesson 23	40	Other special features
Lesson 24	60	Setup versus operation tasks
Lesson 25	40	The two operation panels
Lesson 26	20	Three modes of operation
Lesson 27	60	Key sequences of operation
Lesson 28	40	Verifying new programs safely

Who's using these curriculums?

Fullerton College – Fullerton, CA
Cerritos College – Norwalk, CA
Santa Anna College – Santa Anna, CA
Lanier Technical College – Cumming, GA
Des Moines Area Community College – Ankeny, IA
Rock Valley College – Rockford, IL
Wentworth Institute, Roxbury, MA
Dakota County Technical Institute, Minneapolis, MN
Hennepin Technical College, Brooklyn Park, MN
Maplewoods Community College, Kansas City, MO
Portland Community College, Portland OR
Spartanburg Technical College, Spartanburg, SC
Blinn College, Brenham, TX
West Virginia Wood Technology Center – Elkins, WV

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CNC INSTRUCTORS!

Two curriculums to help you teach CNC courses

1 Machining Center Programming, Setup, & Operation

2 Turning Center Programming, Setup, & Operation

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Our CNC curriculums give you a proven, easy to use, concise, yet comprehensive ready-made training program to minimize the preparation you must do to teach CNC courses. Right out of the box you get PowerPoint slide shows, audio guidance, written instructions, instructor notes, course outline, textbooks, workbooks, answer books, and final test, — everything you need to effectively teach CNC courses for the two most popular types of CNC machine tools in existence today – and with a time-tested approach! We nearly eliminate the preparation you must do in order to teach! Read on to see how you can get them **FREE!**



"I bought into the key concepts approach right away. It really makes teaching easy – and students can easily follow my presentations..."

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Who will benefit?

Instructors working for educational institutions will find our course curriculums especially easy to learn and implement. Most CNC teachers come from one of two backgrounds. Either they have extensive CNC experience, but limited teaching experience – or they have extensive teaching experience, but limited CNC experience. These course curriculums will help in both cases.

Our highly structured teaching approach, textbooks, and slide show presentations will make it easy for even an inexperienced teacher to stay on track. And the instructive *audio guidance* included right in each presentation will make experienced teachers who may be a little weak with their CNC skills look like CNC experts!

Instructors working for manufacturing companies will also find these curriculums very easy to implement. Few companies have the resources or the desire to develop this kind of program completely from scratch. Success for an in-plant training program is not simply a matter of the student getting a good grade. Failure results in scrapped parts, crashed machines, and possibly injured operators. The comprehensive student workbook will prove the student's knowledge of presented materials each step of the way. When the student successfully completes one of these courses, you can rest assured that they comprehend the subject matter.

Training consultants that provide custom training for manufacturing companies will find that this course curriculum makes it easy to teach CNC to their clients. Utilizing standard (and highly portable) computer equipment, the comprehensive slide show can be done on-the-road, meaning instruction can take place anywhere there is a television.

Proven Key Concepts approach

Most training experts agree that students learn best when they have a light at the end of the tunnel. The more complex the subject matter, the more important it is that students understand what they must master to successfully complete the course. With our curriculums, there are ten key concepts to CNC. The first six are programming-related and the last four are setup- and operation-related. Early in the course you can honestly say “If you can understand just ten basic ideas, you are well on your way to becoming proficient with CNC!”

Another benefit of our key concepts approach is that it lets you explain topics at a broad level — which helps your students get the big picture. With so many different CNC machine and control manufacturers, it's impossible to relate every detail of how each is handled. For this reason, students must have the ability to adapt what they learn to their own machines once they complete your course. In each key concept, you first stress the broad and general reasoning behind how CNC functions, showing students *why* they must do things just as importantly as *how* to do them. The same reasoning can be applied to any form of CNC machine tool.

Once the student understands this reasoning, you show them specific techniques needed to apply the key concept to the most popular CNC control in the industry, the *Fanuc* control (many controls claim to be Fanuc-compatible).

Programming key concepts

- 1 Know your machine (programming)
- 2 Prepare to write programs
- 3 Understand the motion types
- 4 Know the compensation types
- 5 Know how to format CNC programs
- 6 Special programming features

Setup & operation key concepts

- 7 Know your machine (operation)
- 8 Know the three modes of operation
- 9 Know the key operation procedures
- 10 Know how to safely verify programs

Lesson structure

The ten key concepts are divided further into lessons. (24 lessons in the machining center curriculum and 28 in the turning center curriculum). Lessons vary in length based upon complexity and content (from 10 minutes to about an hour). See back page for list of lessons with approx. time.

Student materials

Student course materials are copyrighted and must be purchased directly from CNC concepts, Inc.

Textbook - Our highly tutorial textbooks precisely follow the slide show presentations you will be making. Each is very detailed (over 300 pages) and provides students with a way to review what you present — during the course and long after the course is finished.

Workbook - including one exercise per lesson. Some of the lessons include programming activities

Instructor materials

Manuals - Two manuals are included to help you get started. The *For the Instructor* manual provides you with teaching instructions, course outline, a hard copy of the review slide presentation, answer book, final test and answers to the final test. The *Instructor Notes* manual (over 600 pages) parallels the audio guidance, giving you step-by-step instructions for presenting each lesson. All written instructor materials are also included on the CD-rom disk/s in Adobe Acrobat (PDF) format so you can make additional copies as needed. Adobe Acrobat reader is also provided on the CD.

PowerPoint presentations – These colorful, animated presentations will get and hold attention!

- ❖ Over **7,200** slides in machining center curriculum
- ❖ Over **5,000** slides in turning center curriculum

Each presentation includes a presentation links slide to help you get quickly get around within the presentation – and *fly-in text boxes* to help you stay on track. One set of presentations even includes audio guidance to help you prepare to teach! PowerPoint Viewer is also included (though we recommend that you have PowerPoint).

How do you display the slide shows?

Microsoft PowerPoint Viewer is a software program. You'll need some way to transfer the presentation from the computer to a larger screen that students can see.

- Multimedia projector – this device plugs right in to your computer and projects up to an overhead projector screen.
- LCD display unit – this device is placed on a high intensity overhead projector (very bright, watch your eyes!) and up to an overhead projector screen.
- On a normal television monitor – with a simple device called a scan converter (available for about \$100.00), you can display to any television that has a “video in” port.
- We also recommend having a remote mouse. This will allow you to advance slides from anywhere in the classroom.