



**CAREER PATHWAYS FOR SUCCESS**

TRI-COUNTY TECHNICAL COLLEGE



A DUAL ENROLLMENT CAREER PATHWAY FOR  
**CNC PROGRAMMING AND OPERATIONS**

**About the Program**

- Students studying this major learn how to program machines and operate equipment to create metal parts, either in large quantities, or one at the time. Parts may range from simple bolts to complex bone screws for orthopedic implants.
- Created with employer input, Tri-County's CNC program produces graduates in high demand for great paying jobs in companies that are using the latest technologies for competing in the global marketplace.
- Students build a competitive and marketable resume for a variety of employment opportunities, primarily in advanced manufacturing, including aerospace, automotive, medical, and plastics.

**About the Pathway**

- CNC Programming and Operations is a Technical Career Pathway in which courses and textbooks are at no cost to students planning to enter the career field after high school.
- High school students take dual enrollment classes at the TCTC Industrial Technology Center in Sandy Springs, Monday through Thursday, in the afternoon.
- After high school, students seamlessly transition into the Associate in Applied Science degree CNC program at the TCTC Industrial Technology Center.

CONNECT WITH US

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[tctc.edu/careerpathways](http://tctc.edu/careerpathways)

**CNC Programming and Operations CAREER PATHWAY**

**IN HIGH SCHOOL**

11<sup>th</sup> or 12<sup>th</sup> Grade:  
 (COURSES OFFERED IN AFTERNOON)

- EGT 106 (Fall)
- MTT 121 (Fall)
- MTT 122 (Spring)

Students who begin this pathway in 11th grade may take courses in 12th grade with regular college students in morning classes.

**High School Graduation +  
 Introduction to Machining  
 Certificate**

**AFTER HIGH SCHOOL  
 CNC Programming and  
 Operations  
 Associate in Applied Science  
 Degree**

<b>FALL</b>	• MTT 141 • EGT 165 • MAT 170	• General Education Course • Social Science Requirement
<b>SPRING</b>	• MTT 105 • MTT 124	• MTT 251 • MTT 252
<b>SUMMER</b>	• EGT 152 • MTT 212	• MTT 253
<b>FALL</b>	• MTT 254 • ENG 165	• Humanities Requirement
<b>SPRING</b>	• MTT 243	• EGT 265
<b>SUMMER</b>	• MTT 258	• MTT 261

**AFTER TCTC GRADUATION**

Students may go directly to work or continue their education in

**Advanced Manufacturing  
 Technology**

**Bachelor of Applied Science  
 Degree**

Greenville Technical College

SC Mean Annual Wages  
**\$43,220**

# CNC PROGRAMMING AND OPERATIONS

## COURSE DESCRIPTIONS

CNC Programming and Operations will prepare graduates to work as CNC programmers and operators with manufacturers requiring high production volumes or short run batches of discrete parts. In addition to writing CNC programs, students will learn CAD design and analysis applications, create precision set-ups, select tooling, and operate a variety of CNC milling and turning centers.

### EGT 106 - PRINT READING AND SKETCHING

Class Hours: 2 Lab Hours: 3 Credit Hours: 3

This course covers the interpretation of basic engineering drawings and sketching techniques for making multi-view pictorial representations.

### EGT 152 - FUNDAMENTALS OF CAD

Class Hours: 2 Lab Hours: 3 Credit Hours: 3

This course includes a related series of problems and exercises utilizing the computer graphics station as a drafting tool. Course topics will feature an introduction to pictorial presentations including 3-D wire frame and solid models.

### EGT 165 - INTRODUCTION TO CAD/CAM

Class Hours: 1 Lab Hours: 3 Credit Hours: 2

This course covers the basic principles of CNC machine operation, fixturing required to clamp parts in the machine, and basic competencies in CNC programming.

Prerequisites: EGT 152

### EGT 265 - CAD/CAM APPLICATIONS

Class Hours: 2 Lab Hours: 3 Credit Hours: 3

This course includes applications using CAD/CAM routines.

Prerequisites: EGT 165 or approval needed by the Department Head, Program Director, or Coordinator of Instructional Activities.

### ENG 165 - PROFESSIONAL COMMUNICATION

Class Hours: 3 Lab Hours: 0 Credit Hours: 3

This course develops practical written and oral communication skills.

Prerequisites: Satisfactory placement scores in both Reading and Writing.

Note: This course cannot be used for an AA or AS degree.

### MAT 170 - ALGEBRA, GEOMETRY AND TRIGONOMETRY I

Class Hours: 3 Lab Hours: 0 Credit Hours: 3

This course includes the following topics: elementary algebra, geometry, trigonometry and applications.

Prerequisites: Satisfactory math placement scores, or MAT 032 with a grade of C or better.

### MTT 105 - MACHINE TOOL MATH APPLICATIONS

Class Hours: 3 Lab Hours: 0 Credit Hours: 3

This course is a study of shop math relevant to the machine tool trade.

### MTT 121 - MACHINE TOOL THEORY I

Class Hours: 3 Lab Hours: 0 Credit Hours: 3

This course covers the principles involved in the production of precision metal parts.

Corequisite: MTT 122.

### MTT 122 - MACHINE TOOL PRACTICE I

Class Hours: 1 Lab Hours: 9 Credit Hours: 4

This course covers practical experiences using the principles in Machine Tool Theory I.

Corequisite: MTT 121.

### MTT 124 - MACHINE TOOL PRACTICE II

Class Hours: 1 Lab Hours: 9 Credit Hours: 4

This course covers the practical application of the principles in Machine Tool Theory II.

Prerequisites: MTT 122.

### MTT 141 - METALS AND HEAT TREATMENT

Class Hours: 3 Lab Hours: 0 Credit Hours: 3

This course is a study of the properties, characteristics, and heat treatment procedures of metals.

### MTT 212 - TOOL DESIGN

Class Hours: 2 Lab Hours: 6 Credit Hours: 4

This course is a study of the development, material selection, manufacturing and machining procedures necessary in the production of tools and tooling.

Prerequisites: MTT 124.

### MTT 243 - ADVANCED DIMENSIONAL METROLOGY FOR MACHINISTS

Class Hours: 3 Lab Hours: 0 Credit Hours: 3

This course is a study of higher levels of measurement, measuring instruments, and measuring techniques. The course consists of a theoretical and practical study incorporating the metric system, geometric dimensioning/tolerancing, sine bars/plates for compound angles and more.

### MTT 251 - CNC OPERATIONS

Class Hours: 2 Lab Hours: 3 Credit Hours: 3

This course is a study of CNC machine controls, setting tools, and machine limits, and capabilities.

### MTT 252 - CNC SETUP AND OPERATIONS

Class Hours: 2 Lab Hours: 6 Credit Hours: 4

This course covers CNC setup and operations.

Corequisite: MTT 251 or approval needed by the Department Head, Program Director, or Coordinator of Instructional Activities.

### MTT 253 - CNC PROGRAMMING AND OPERATIONS

Class Hours: 1 Lab Hours: 6 Credit Hours: 3

This course is a study of the planning, programming, selecting tooling, determining speeds and feeds, setting up, operating, and testing of CNC programs on CNC machines.

Prerequisites: MTT 252 or approval needed by the Department Head, Program Director, or Coordinator of Instructional Activities.

### MTT 254 - CNC PROGRAMMING I

Class Hours: 2 Lab Hours: 3 Credit Hours: 3

This course is a study of CNC programming, including machine language and computer-assisted programming.

Prerequisites: MTT 253 or approval needed by the Department Head, Program Director, or Coordinator of Instructional Activities.

### MTT 258 - MACHINE TOOL CAM

Class Hours: 2 Lab Hours: 3 Credit Hours: 3

This course is a study of computer-assisted manufacturing graphics systems needed to create CNC programs.

Prerequisites: EGT 265 or approval needed by the Department Head, Program Director, or Coordinator of Instructional Activities.

### MTT 261 - ADVANCED MULTI-AXIS PROGRAMMING AND OPERATIONS II

Class Hours: 1 Lab Hours: 9 Credit Hours: 4

This course is a study of advanced CNC multi-axis machine programming, advanced contouring, and simultaneous multi-axis machining of 3D parts.

Prerequisites: EGT 265.

