

ENGT 015A: COMPUTER NUMERICAL CONTROLS IA

Originator

dgonzalez

Justification / Rationale

Labor Market Indicators show that there are jobs available and an advisory committee recommends the course.

Effective Term

Fall 2019

Credit Status

Credit - Degree Applicable

Subject

ENGT - Engineering Technology

Course Number

015A

Full Course Title

Computer Numerical Controls IA

Short Title

CNC IA

Discipline**Disciplines List**

Engineering Technology

Modality

Face-to-Face

Catalog Description

This course is the first of an introduction to Computer Numerical Control (CNC) programming course series. Students will learn about the manufacturing processes, product design, robotics and automation. Computer Aided Design and Manufacturing skills will be utilized to produce products using a Computer Numerical Control (CNC) mill.

Schedule Description

This course is the first of an introduction to Computer Numerical Control (CNC) programming course series.

Lecture Units

0.5

Lecture Semester Hours

9

Lab Units

0.5

Lab Semester Hours

27

In-class Hours

36

Out-of-class Hours

18

Total Course Units

1

Total Semester Hours

54

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Valentino, James V., Goldenberg, Joseph

Title

Introduction to Computer Numerical Control

Edition

5th

Publisher

Pearson

Year

2012

College Level

Yes

ISBN #

978-0132176033

For Text greater than five years old, list rationale:

This is the most recent edition of the book available.

Class Size Maximum

30

Course Content

1. Introduction to Computer Numerical Control (CNC) Manufacturing
 - a. Definition, concepts and advantages
 - b. Components
 - c. Advantages of CNC compared with NC
 - d. Financial Rewards
 - e. CNC machining centers and turning centers
 - f. Other types of CNC equipment
 - g. CNC input and storage media
2. Modern Machine Tool Controls
 - a. Types of system control
 - b. Loop Systems
 - c. Cartesian Coordinates
 - d. CNC Machine axes of motion
 - e. Tool positioning modes
 - f. Units used for Positioning Coordinates
3. Tooling for Hole and Milling Operations
 - a. Tooling for Drilling operations
 - b. Carbide Insert Technology
 - c. Tooling for hole operations that follow drilling
 - d. Cutting speeds and feeds
 - e. Tooling for profile milling and facing
 - f. Coated tooling

- g. Tool speeds and feeds for milling
- h. Feed directions for milling operations
- i. Cutting Fluids for CNC operations

Lab Content

1. Introduction
2. Interfacing with CNC machine
3. Design of a part
4. Construction of part

Course Objectives

Objectives	
Objective 1	Identify the use of robotics in manufacturing.
Objective 2	Identify what basic components comprise Computer Numerical Control (CNC) systems.
Objective 3	Identify the different media used to input and store Computer Numerical Control programs
Objective 4	Analyze the two types of control systems used to output tool movement.
Objective 5	Identify the two types of loop systems used with Computer Numerical Control controllers.
Objective 6	Evaluate Computer Numerical Control machine axis of motion.
Objective 7	Analyze the types and applications of drills used with Computer Numerical Control equipment.
Objective 8	Identify and describe the tooling used for such hole operations as boring, reaming, tapping, counterboring, and countersinking.
Objective 9	Create a program to produce a drilled part from a blank using holing operations.

Student Learning Outcomes

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Write simple Computer Numeric Control (CNC) milling programs with the aid of preset commands.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Collaborative/Team	Students will be expected to work with other students in a lab setting and also to study for homework and exams.
Discussion	During lecture students will be expected to discuss the material and answer questions.
Laboratory	Laboratory will provide a hands-on learning approach of the theory provided in lecture.
Lecture	Lecture will be provided to introduce and explain the material to the students.
Participation	Students are expected to participate in lecture and lab by giving feedback, answering questions, staying attentive, and performing the lab experiments.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Computational/problem-solving evaluations	Students will be assigned homework and quizzes over Canvas. Also, labwork will utilize both Computer Aided Design and CNC machines that require computational problem solving.	In and Out of Class
Group activity participation/observation	During lab students will work in teams to perform and solve the lab report.	In and Out of Class
Laboratory projects	During Lab students will be expected to discuss with their classmates the purpose of the lab and their findings. Laboratory projects will be assigned to teach students how to operate a CNC machine.	In and Out of Class

Mid-term and final evaluations	Students will be tested through Canvas to determine their understanding of the material.	In Class Only
Student participation/contribution	Students will be evaluated by their participation in both lecture and lab.	In Class Only
Tests/Quizzes/Examinations	Quizzes and Exams will include multiple choice questions.	In Class Only
Written homework	Homework will be assigned via Canvas and some questions will require a written answer.	Out of Class Only

Assignments

Other In-class Assignments

1. Take notes
2. Participate in discussion
3. Quizzes
4. Labs
5. Lab notebooks
6. Midterm/Final Exams

Other Out-of-class Assignments

1. Lab write up
2. Reading assignments
3. Writing assignments

Grade Methods

Letter Grade Only

MIS Course Data

CIP Code

15.0000 - Engineering Technology, General.

TOP Code

092400 - Engineering Technology, General

SAM Code

C - Clearly Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Funding Agency Category

Not Applicable

Program Status

Not program-applicable

Transfer Status

Not transferable

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Files Uploaded

Attach relevant documents (example: Advisory Committee or Department Minutes)

EngrTech Advisory 02-27-18 Minutes and Handouts.pdf

Approvals**Curriculum Committee Approval Date**

11/06/2018

Academic Senate Approval Date

11/29/2018

Board of Trustees Approval Date

12/14/2018

Chancellor's Office Approval Date

3/20/2019

Course Control Number

CCC000603612

Programs referencing this course

Engineering Technology AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=209>)

Robotics Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=211>)