###### COURSE SYLLABUS

###### Semester:  Year: 2013

**Mission Statement:**

Richard J. Daley College provides high-quality education which leads to academic success, career development, and personal enrichment that fulfill diverse community needs.

###### Course (Discipline): Manufacturing Technology Number: 137 Section:       IAI#:

**Course Title:** CNC Turning Operations and Programming **Length of Course (Weeks):** 16

**Credit Hours:** 3 **Lecture Hours:** 1 **Lab Hours:** 4 **Contact Hours:** 5

**Meeting Day(s):**       **Times:**       **Building:**       **Classroom #:**

**Syllabus can be found on Blackboard website at** [**https://ccc.blackboard.com/webapps/login/**](https://ccc.blackboard.com/webapps/login/)**.**

###### Dean, College to Careers in Advanced Manufacturing \_\_Ray Prendergast\_\_\_\_\_\_\_

###### E-mail Address: rprendergast@ccc.edu Phone #: 773-838-7786

#### Address: 7500 South Pulaski Road Chicago, IL 60652

#### Office hours:

**Course Description**:

This course introduces the programming, setup, and operation of Computer Numerical Control (CNC) turning centers. Topics include programming formats, control functions, program editing, part production, and inspection. Various projects will strengthen the students’ skills in the proper use, programming and troubleshooting of this equipment. Students will also have the chance to earn the NIMS Level 1 CNC Turning Program, Setup, and Operate credential. Writing assignments, as appropriate to the discipline, are part of the course.

**Course Prerequisites**:

Grade of C or better in 340MFGT 140 CNC and 340MFGT 111-1, or Consent of Department Chairperson.

**Students Course is Expected to Serve:**

Students enrolled in the Manufacturing Technology program with an interest in Computer Numerical Control (CNC) Machining.

**Course Objectives**:

1. Develop applied math skills in geometry and trigonometry for CNC programming.
2. Develop knowledge of CNC lathes and component parts.
3. Demonstrate the effective use of simple and multiple repetitive canned cycles.
4. Know and understand best practice in workplace safety in the operation of CNC machinery.
5. Earn the NIMS Level 1 CNC Turning Programming, Setup and Operate credential.

**Student Learning Outcomes:**

Upon completion of this the student will be able to:

1. Use Cartesian coordinate systems and trigonometric functions to determine coordinate locations for CNC programs, for example tangent points of blend radii on angled surfaces and tapers.
2. Set and edit geometry and tool nose radius offsets.
3. Apply the effective use of simple and multiple repetitive canned cycles.
4. Perform all necessary tasks to complete part from print and verify conformance to print requirements for at least two practice pieces with at least one internal feature and tolerances of +/-.003”.
5. Write a CNC program (without using CAD or CAM software) using linear and circular interpolation, and canned cycles for a practice part.
6. Program, set up, and operate a CNC lathe to produce the NIMS CNC Turning Level 1 project part.

**Recommended Texts and Course Materials:**

***Text:***

1. Turning Center Setup and Operation, CC-TCSO-M, by Mike Lynch., 1st edition, CNC Concepts, Inc., 2009.
2. Turning Center Programming, CC-TCP-M, by Mike Lynch., 1st edition, CNC Concepts, Inc., 2009.

***Materials:***

Haas CNC Turning Centers

Haas CNC control simulators

Predator CNC Verification software

Related tooling, fixtures and measuring instruments

**Additional Course Requirements:**

N/A

**Recommended Methods of Instruction:**

The methods of instruction will include lecture, small group work in machine shop lab, and project-based learning.

**Recommended Methods of Evaluation:**

Your midterm and final course grades will be based on the following assessments.

Chapter tests

Projects

Final examination

Attendance

Earning a NIMS CNC milling credential

Grading Scale:

90-100% = A

 80-89 = B

 70-79 = C

 60-69 = D

 Below 60 = F

See the Policy on grade designations and grade appeals at:

<http://www.ccc.edu/colleges/daley/departments/Pages/Grade-Appeal-Policy-and-Procedure.aspx>

**NOTE:** Type or copy and paste the link above into a web browser to view its content.

### Topical Outline / Course Calendar:

1. Planning for Programming CNC lathes
2. Horizontal slant bed lathe configuration
3. Linear and circular interpolation for the lathe.
4. Lap and canned cycle modes for bar facing/turning/boring.
5. Tooling for CNC lathes
6. Edit/Troubleshoot programming and process errors.
7. Process, programming, set up, and operating documentation for CNC lathe manufacturing.
8. Geometry/wear offsets.

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