###### COURSE SYLLABUS

###### Semester:  SPRING 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: 140 Section:       IAI#:

**Course Title:** Computer Numerical Control (CNC) Fundamentals **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\_\_\_\_\_\_\_

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#### Office hours:

**Course Description**:

The course introduces students to the CNC process, the operation of the CNC lathe and mill, and to the basic set up, tooling, operation, and trouble-shooting of CNC machines. Topics include Cartesian coordinates, control function, and the identification and use of various cutting tools. Students will earn at least one NIMS Level 1 CNC operator credential. Writing assignments, as appropriate, are a part of the course.

**Course Prerequisites**:

Eligibility for Math 99, and grade of C or better in 340MFGT 111-1 or 340MFGT 112-1; 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 algebra and geometry.
2. Understand CNC turning and machining center functions and applications.
3. Identify axis movements of CNC machines.
4. Develop basic knowledge of CNC set-up, tooling and operations.
5. Define the function of NC program codes.
6. Understand principles of workplace safety in the operation of CNC machinery.
7. Earn the NIMS Level 1 CNC operator credentials in milling and turning.

**Student Learning Outcomes:**

Upon completion of this the student will be able to:

1. Set work, geometry, and wear offsets.
2. Download and upload NC data to/from machine;
3. Make a basic setup on CNC lathe and mill.
4. Produce at least three different parts to print specifications on a CNC lathe and at least 3 different parts on a CNC mill
5. Earn at least one NIMS Level 1 CNC operator credential (milling and/or turning)

**Recommended Texts and Course Materials:**

***Text:***

Lynch, M. (2009). *Machining Center Setup and Operation, First Edition*. Cary, IL: CNC Concepts, Inc. ISBN: 1930861-257.

Lynch, M. (2009). *Turning Center Setup and Operation, First Edition*. Cary, IL: CNC Concepts, Inc. ISBN: 1930861-273.

***Materials:***

Scientific pocket calculator (preferably TI-30x)

***Shop Equipment:***

Haas CNC machining centers

Haas CNC lathes

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 operator 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:

Week 1: Introduction to CNC Lathes. Basic machining practices

 Haas Simulator. Cartesian coordinates X & Z

Week 2: Chucks, Chuck jaw changing

Week 3: Haas Control Panel/ Haas Simulator

Week 4: Setting Tools Geometry offsets

Week 5: Work and Wear Offsets

Week 6: Machine feeds and speeds for turning operations

Week 7: General flow of the CNC process on turning centers

 Loading and storing programs

Week 8: Tasks required to run a CNC Turning Center

 Midterm, NIMS CNC Lathe Operator’s Examination

Week 9: Introduction to CNC Vertical Machining Centers.

 Haas Simulator. Cartesian coordinates X,Y & Z

 Basic machining practices

Week 10: Machine vises, more on G-codes

Week 11: Haas Control Panel/ Haas Simulator for milling

Week 12: Setting Tools Geometry offsets on a CNC mill

Week 13: Work and Wear Offsets

Week 14: Machine feeds and speeds for milling operations

Week 15: General flow of the CNC process on machining centers

 Loading and storing programs

Week 16: Tasks required to run a CNC Machining Center

 Final Exam, NIMS Milling Machine Operator’s Examination

This workforce solution was funded by a grant awarded by the U.S. Department of Labor’s Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timelines, usefulness, adequacy, continued availability, or ownership. This solution is copyrighted by the institution that created it. Internal use, by an organization and/or personal use by an individual for non-commercial purposes, is permissible. All other uses require the prior authorization of the copyright holder.