MTT241 CNC Operations Syllabus

Course Information
Credits 3
Campus Washburn Institute of Technology
Address 5724 SW Huntoon
City/State/Zip Topeka, Kansas 66604
Office Fax 785-273-7080

Description
Students will become acquainted with the history of Numerical Control (NC) and Computer Numerical Control (CNC) machines and will be introduced to a CNC machine used in the precision machining trades. They will gain practical experience in the application of “G” codes and “M” codes, writing CNC machine programs, and machine setup and operation. Prerequisites: OSHA 10 or 30 Safety Course; Machining I; Machining II.

Textbooks


Student Learning Outcomes:
A. Communicate effectively
B. Integrate technology
C. Learn effectively
D. Demonstrate cooperative teamwork skills
E. Apply safety in the workplace
F. Think critically and creatively
G. Demonstrate responsible work ethics

Competencies
1. Conduct job hazard analysis for CNC lathe and mill.
2. Create handwritten CNC programs using G and M codes.
3. Perform software communications between PC and CNC equipment.
4. Enter CNC Program into control.
5. Enter programs in MCI (manual data input)
6. Edit CNC programs
7. Perform sequence search to restart or edit programs.
8. Execute CNC program sequences from zero or point of reference.
9. Execute emergency stop and restart procedures.
10. Interrupt automatic cycle mode manually to stop potential damage to part and/or machine.
11. Orient machine axis with holding devices.
12. Thread interior and exterior surfaces.
13. Determine spindle speed and feed rate.
14. Perform facing operations to rough or finish surfaces.
15. Perform turning operations to rough or finish a surface.
17. Verify CNC programs prior to executing program sequence.
18. Bore cylindrical surfaces on CNC equipment.
19. Power up and power down CNC machines.
20. Plan CNC machining operations.
21. Adjust cutter compensation to maintain accuracy of cuts.
22. Ream holes to specification with CNC lathes and mills.

**Guidelines for Success**

**Assessment Plan**
Assessment is an integral part of the educational process at Washburn Tech and accurate feedback is an important tool in continuously improving the institution’s technical programs. Students can expect to participate in assessment activities prior to entry into programs, within specific courses and following program completion for specific fields of study.

**Grading Rationale and Grading Scale**
Grading is based on the quality of shop assignments, attendance, tests and quiz scores.

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90% - 100%</td>
<td>A</td>
</tr>
<tr>
<td>80% - 89%</td>
<td>B</td>
</tr>
<tr>
<td>70% - 79%</td>
<td>C</td>
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<tr>
<td>60% - 69%</td>
<td>D</td>
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<tr>
<td>Below 60%</td>
<td>F</td>
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The minimum acceptable passing grade is C. The total grade will be calculated using the following formula: Attendance = 10%, shop assignments = 30%, tests = 20% and quizzes = 10%, Semester final = 30%. 100% attendance adds 5% to the final score, less than 90% attendance deducts 5% from the final score.

**Attendance**
Attendance is required. Please see instructor for make-up policy for excused and school related absences.
Disability
The Special Support Services (SSS) Office is responsible for assisting in arranging accommodations and for identifying resources at Washburn Institute of Technology for persons with disabilities. Qualified students with disabilities MUST register and provide documentation with the office to be eligible for services. New requests for accommodations should be submitted two months or more prior to the date services should begin; however, contact the SSS Office as soon as a need may arise. Depending on the accommodation request, four to eight week lead time may be needed for timely and effective provision of services. SSS coordinates and assist in arranging services it deems appropriate of eligible students on a case-by-case basis.

If you are a student with a disability that may substantially limit your ability to participate in this class and believe you will need accommodations, it is your responsibility to contact:

Special Support Services Coordinator
Phone: 785-228-6356
E-Mail: ssscoordinator@washburn.edu