

Minnesota Articulated College Credit (ACC) Agreement

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Agreement Name: **CAD/CAM & 3D Printing**

Agreement Last Reviewed: **Fall 2023**

Next Review Date: **Fall 2025**

College Courses			
Class	Title	School	Credits
MACH 1662	Introduction to CAD/CAM & 3D printing	Minnesota State College Southeast	3.0 of 3.0
MDAD 0	Basic Drafting Technologies - Regional	Minnesota State College Southeast	1.0 of 1.0
MACT 2827	Computer Assisted Machining II	Ridgewater College	1.0 of 3.0
MACT 2506	Reverse Engineering for Machinists	AND Ridgewater College	1.0 of 3.0
CAD 1151	3D Printing, Additive Manufacturing & Prototyping	Rochester Community & Technical College	1.0 of 2.0
CAD 2400	Reverse Engineering & Rapid Prototyping	Rochester Community & Technical College	1.0 of 2.0
CIM 1110	Concept Engineering I	South Central College	1.0 of 2.0
CIM 1120	Computer Control Programming I	AND South Central College	1.0 of 3.0
CIM 1130	Quality Assurance I	AND South Central College	1.0 of 3.0

These credits are valid for students 2 years after high school graduation from the completion of this course.

Curriculum Content Objectives

100% of the curriculum learning outcomes will be covered in the high school course(s) by qualified CTE high school instructor(s).

1. Apply all safety standards to machining applications and selections
2. Draw 2-D geometry features using a CAD drafting software
3. Create 3-D features for part design using the Extrude tools of the CAD system
4. Create 2-dimensional drawing prints on Title Block format
5. Apply current drafting principles to views and dimensions
6. Select appropriate tooling for a machining application
7. Calculate tool speeds & feeds for a specific machining application
8. Use the Windows file management system to save geometry files
9. Use the CAM software to generate tool path files
10. Use the CAM software programming system to write an NC file
11. Use the Windows file management system to save NC program files
12. Select proper cutter compensation for a machining application
13. Generate the graphic verification of tool path files in the CAM software
14. Understand "post processor" selection for machining
15. Use 3D printing slicing software to slice a CAD model for 3D printing
16. Adjust slicing settings in the 3D printing software
17. Print out 3D model using a 3D printer
18. Complete all assigned drawings, tutorials, tests, and other tasks

Assessments

Students must achieve no less than 80% or B for a final grade in the high school course to receive ACC.

1. Drafting principles using a CAD system
2. File folder management in a CAD system
3. 2-D & 3-D model design
4. Application of Computer Aided Machining (CAM)
5. Communication systems between CAD/CAM and Machine Tool
6. 3D printing from 3D CAD models

ACC Concept

Through Articulated College Credit (ACC), specific college curriculum content goals and assessments are embedded in participating high school career and technical education (CTE) programs as specified in this agreement. Relevant knowledge, skills, and standards are taught by qualified CTE high school instructor(s) in one or more high school course. ACC is awarded if the student meets the college equivalency standards and later enrolls in the college(s) listed requiring the course in a specific program.