

Minnesota Articulated College Credit (ACC) Agreement

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Agreement Name: **Introduction to Engineering & Design**

Agreement Last Reviewed: **Fall 2023**

Next Review Date: **Fall 2025**

College Courses			
Class	Title	School	Credits
DRFT 1001	Principles of Engineering	Ridgewater College	1.0 of 1.0
CAD 1226	Drafting for Industry	Rochester Community & Technical College	1.0 of 4.0
CMAE 1526	Maintenance Awareness	South Central College	1.0 of 2.0

Curriculum Content Objectives

To receive credit, students will meet 100% of the following content objectives:

- 1. Describe the design process**
 - Identify basic design tools
 - Discuss design approach & strategies
 - Characterize modeling techniques
 - Use an Engineering Notebook **and/or***
 - Create a Student Portfolio*
 - Develop a design project plan
 - Describe & apply reverse engineering principles.
- 2. Develop formal research techniques**
 - Analyze technical data & general references
 - Construct a contact log
 - Analyze design contracts
 - Interpret working drawings
- 3. Create problem statements**
 - Develop specifications and constraints
 - Create a decision matrix
 - Justify problem statement
 - Develop an advantage/disadvantage matrix of each solution
 - Plan alternative solutions
- 4. Keep daily research journal**
 - Develop working drawings
 - Review technical data
 - Identify source information
- 5. Apply measurement and statistics to the design process**
 - Review history of measurement
 - Apply English & Metric linear measurements
 - Use a dial caliper **and/or***
 - Use a micrometer*
 - Review geometric shapes
 - Review linear dimensions
 - Adapt applied statistics
 - Identify dimensioning conversions
 - Factor tolerance
- 6. Review mathematics, science & engineering methods**
 - Apply algebra, trigonometry & geometry to designs
 - Adhere to properties of physics
 - Demonstrate engineering methods during design process
- 7. Explore design project parameters**
 - Explain decision matrix
 - Apply brainstorming techniques
 - Demonstrate teamwork
 - Identify subsystems
 - Review project budget
 - Develop bill of materials
 - Create prototype

8. Develop a system for continuous improvement

- a. Meet desired needs within realistic constraints (economic & environmental)
- b. Analyze/critique manufacturability
- c. Formulate & solve engineering problems

9. Use engineering techniques

- a. Define engineering practice
- b. Look up data in technical manuals
- c. Analyze problem solving activities
- d. Use test equipment

10. Apply standards

- a. Design
- b. Safety
- c. Quality

11. Develop a prototype

- a. Draft a concept model
- b. Evaluate materials
- c. Calculate the data for validity
- d. Improve on design
- e. List modifications
- f. Implement modifications

12. Deliver formal presentation

- a. Format technical research paper
- b. Document sources
- c. Prepare formal presentation (focus is on presentation skills)
- d. Participate in group evaluation
- e. Generate peer feedback

Assessments

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

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.