MASTER COURSE OUTLINE

A. ARET 2150 Engineering Design and Fabrication

B. COURSE DESCRIPTION:

This course provides students entering the fields of Mechatronics and Packaging with an overview of Computer-Aided-Design (CAD) software and Computer-Numeric-Control (CNC) machines. Students will design basic parts and build the parts on CNC machinery. Emphasis will be on the interactions between software and machines and the troubleshooting process.
(2 Cr – 1 lect, 1 lab)

C. Core Theme: Critical Thinking

D. RIVERLAND INSTITUTIONAL LEARNING OUTCOMES:

This course addresses the following Riverland Institutional Learning Outcome(s):
☒ ILO 1: critical thinking *(Core Theme Goal 2)*
☐ ILO 2: awareness of the larger global community *(Core Theme Goal 7 or 8)*
☐ ILO 3: ethical, engaged citizenship *(Core Theme Goal 9 or Goal 10)*
☐ ILO 4: communication and collaboration *(Discipline Goal 1 and by any learning outcome(s) involving communication or collaboration)*

E. MAJOR CONTENT AREAS:

- Create assembly models with CAD software
- Analyze prints as applied to industrial components
- Use Computer Numeric Control (CNC) machines to create parts
- Apply G-code and M-code to CNC machinery
- Troubleshoot G and M Codes
- Apply feed and speed rates on CNC machinery

F. GOAL TYPE, OBJECTIVES, AND OUTCOMES:

GOAL TYPE	**OBJECTIVES** **Students will be able to**	**OUTCOMES** **The student will successfully**
**Critical Thinking	gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.	1. analyze prints as applied to industrial components.
CS	define G & M code program.	1. identify G codes with CNC machinery.

		2. identify M codes with CNC machinery.
CS	understand CAD software.	1. create assembly models with CAD software. 2. use computer numeric control (CNC) machines to create parts.
CS	recognize proper safety protocols.	1. analyze proper feed rates on CNC machinery.

G. SPECIAL INFORMATION:

This course may require use of the Internet, the submission of electronically prepared documents and the use of a course management software program. Students who have a disability and need accommodations should contact Accessibility Services at the beginning of the semester. This information will be made available in alternative format, such as Braille, large print, or current media, upon request.

H. COURSE CODING INFORMATION: Course Code S/Class Maximum 24; Letter Grade

Revision date:
AASC Approval date: 02/15/22

***Riverland Community College Disciplines**	**MnTC Goal Number**
Communication (CM)	**1**
Natural Sciences (NS)	**3**
Mathematics/Logical Reasoning (MA)	**4**
History and the Social & Behavioral Sciences (SS)	**5**
Humanities and Fine Arts (HU)	**6**

****Riverland Community College Core Themes**	**MnTC Goal Number**
Critical Thinking (CT)	**2**
Human Diversity (HD)	**7**
Global Perspective (GP)	**8**
Ethical and Civic Responsibility (EC)	**9**
People and the Environment (PE)	**10**

*These five MnTC Goals have been identified as Riverland Community College Disciplines.
** These five MnTC Goals have been identified as Riverland Community College Core Themes.
NOTE: The Minnesota Transfer Curriculum "10 Goal Areas of Emphasis" are reflected in the five required discipline areas and five core themes noted in the Riverland Community College program of study guide and/or college catalog.