Bachelor of Science
Individualized Degree Program
Advanced Manufacturing Sciences, Digital Security in Manufacturing

Background and Rationale

In December 2014, Congress passed the Revitalize American Manufacturing and Innovation Act (RAMI Act) into law, which gave Congressional authorization to establish a network of manufacturing innovation institutes with technology emphasis of highest importance to the nation. Today, these breakthrough technologies are leading us into a Fourth Industrial Revolution that is fusing the physical and digital worlds.

Manufacturing USA® is the national network created by 16 manufacturing innovation institutes (sponsored by either the U.S. Department of Commerce, Defense, or Energy) which bring together member organizations from manufacturers of all sizes, academia and government to work on major research and development projects relevant to industry and train people on advanced manufacturing skills.

This large-scale approach to manufacturing innovation is paving the way for the adoption of advanced manufacturing technologies and processes across the U.S. industrial base, giving rise to new industries and creating exciting, well-paid manufacturing jobs.

Description

The interdisciplinary Advanced Manufacturing Sciences (AMS) Digital Security in Manufacturing IDP program mirrors the Manufacturing USA® Cybersecurity Manufacturing Innovation Institute (CyManII). The program combines the fields of advanced manufacturing, computer science, mechanical engineering, and electrical engineering and introduces a cybersecure energy-ROI for energy efficient manufacturing and supply chains to secure and sustain American leadership in global manufacturing competitiveness. With hands-on laboratory classes and sound theoretical coursework, this four-year professional undergraduate program will prepare you for an innovative career in advanced manufacturing.

Contact:
Center for Individualized Learning
Administrative Building, Room 360
303-615-0525
msudenver.edu/individualized-degrees/

Advanced Manufacturing Sciences, Digital Security in Manufacturing IDP Recommended Coursework

General Studies Program

Students must take approved courses that fulfill the following distribution and credit requirements. Refer to the current MSU Denver University Catalog to review approved General Studies coursework and completion requirements.

Advanced Manufacturing Sciences, Digital Security in Manufacturing IDP Recommended Coursework

General Studies Courses

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Written Communication (6 Credits Required)

Recommended Course: ENG 1010 - Composing Arguments (3)

Recommended Course: ENG 1020 - Research & Argument Writing (3)

Oral Communication (3 Credits Required)

Select one course from Oral Communication course list (3)

Quantitative Literacy (3 Credits Required)

Recommended Course: MTH 1110 College Algebra for Calculus (4)

Arts and Humanities (6 Credits Required)

Select one course from the Arts and Humanities course list (3)

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Historical (3 Credits Required)

Select one course from the Historical course list (3)

Natural and Physical Sciences (6 Credits Required)

Select one course from the Natural and Physical Sciences List

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Social and Behavioral Sciences (6) Credits Required)

Select one course from Social and Behavioral Sciences course list (3)

Recommended Course: CET 3120 Engineering Economy (3)

Multicultural and Global Diversity Requirements:

Students may fulfill the multicultural and global diversity requirements by taking approved courses within one of the following categories: arts and humanities; historical; natural and physical sciences; or social and behavioral sciences.

General Studies Courses:
(34) Credit Hours; (3) Upper Division

Digital Security in Manufacturing Courses

AMS 1010 - Survey of Advanced Manufacturing and Workplace Preparation (3)

AMS 3010 - Additive Manufacturing Stratasys Certification Preparation (3)

AMS 4950 - Senior Experience Professional Internship (3)

CS 1030 - Computer Science Principles (4)

CSS 2751 - Principles of Cybersecurity (3)

CSS 2752 Information Assurance (3)

CSS 2753 Network Security (3)

CSS 2754 Host Security (3)

CSS 3751 Application Security (3)

CSS 3752 Computer Forensics (3)

CSS 3753 Computing & Security for Manufacturing (3)

EET 1001 - Electronics: An Introduction (3)

JMP 2610 - Introduction to Technical Writing (3)

MET 1010 - Manufacturing Processes (3)
OR IND 2830 - Manufacturing Materials and Processes (3)

MET 1200 - Technical Drawing I (3)
OR IND 1450 - Technical Drawing and CAD (3)
OR CET 1215 - Engineering Graphics (3)

MET 1310 - Principles of Quality Assurance (3)

MET 2010 - CNC Machining and Inspection (3)

MET 3000 - Manufacturing Analysis (4)

MET 3630 - Lean Manufacturing Systems Engineering (3)

MTH 1120 - College Trigonometry (3)

Electives

You may choose (25) credit hours of Electives

(15) credit hours must be Upper Division courses to fulfill the University requirement of (40) upper division credit hours.

Digital Security in Manufacturing Courses:
(87) Credit Hours; (37) Upper Division

TOTAL UPPER DIVISION HOURS: 40
TOTAL CREDIT HOURS: 121

Academic Plan – Digital Security in Manufacturing

Semester 1 - Fall	**Semester 2 - Spring**
○ ENG 1010 Composing Arguments (3) (GS) ○ Oral Communication (3)(GS) ○ Art and Humanities (3) (GS) ○ Quantitative Literacy **Recommended Course:** MTH 1110 College Algebra for Calculus (4) ○ AMS 1010 Survey of Advanced Manufacturing & Workplace Prep (3) **Total Credit Hours 16**	○ ENG 1020 Research and Argument Writing (3) (GS) ○ Historical (3) (GS) ○ CS 1030 Computer Science Principles (4) ○ MET 1010 (3) Manufacturing Processes (3) ***OR*** IND 2830 Manufacturing Materials & Processes (3) ○ MTH 1120 College Trigonometry (3) **Total Credit Hours 16**
Semester 3 - Fall	**Semester 4 - Spring**
○ Art and Humanities (3)(GS) ○ Natural & Physical Sciences (3) (GS) ○ CSS 2751 Principles of Cybersecurity (3) ○ MET 1200 Technical Drawing I (3) ***OR*** IND 1450 Technical Drawing and CAD (3) ***OR*** CET 1215 Engineering Graphics (3) ○ EET 1001 Electronics: An Introduction (3) **Total Credit Hours 15**	○ Social & Behavioral Sciences (3)(GS) **Recommended Course:** CET 3120 Engineering Economy ○ Natural & Physical Sciences (3) (GS) ○ CSS 2752 Information Assurance (3) ○ JMP 2610 Introduction to Technical Writing (3) ○ MET 1310 Principles of Quality Assurance (3) **Total Credit Hours 15**
Semester 5 - Fall	**Semester 6 - Spring**
○ CSS 2753 Network Security (3) ○ MET 2010 CNC Machining and Inspection (3) ○ MET 3000 Manufacturing Analysis (4) ○ *Elective (1)* **Recommended Course:** IND 1000 Introduction to Industrial Design (1) ○ *Elective (3)* ○ *Elective (3)* **Total Credit Hours 17**	○ Social & Behavioral Sciences (3)(GS) ○ CSS 2754 Host Security (3) ○ *Elective (3)* ○ *Elective (3)* ○ *Elective (3)* **Total Credit Hours 15**
Semester 7 - Fall	**Semester 8 - Spring**
○ AMS 3010 Additive Manufacturing Stratasys Certification Preparation (3) ○ CSS 3751 Application Security (3) ○ CSS 3752 Computer Forensics (3) ○ MET 3630 Lean Manufacturing Systems Engineering (3) ○ *Elective (3)* **Total Credit Hours 15**	○ AMS 4950 Senior Experience Professional Internship (3) ○ CSS 3753 Computing & Security for Manufacturing (3) ○ *Elective (3)* ○ *Elective (3)* **Total Credit Hours 12**