

**Bachelor of Science
Individualized Degree Program, Incubator
Advanced Manufacturing Sciences, Robotics**

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) Robotics IDP program mirrors the Manufacturing USA® robotics institute, combining the fields of advanced manufacturing, computer science, mechanical engineering, and electrical engineering. 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:

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Advanced Manufacturing Sciences, Robotics IDP Recommended Coursework

General Studies Courses

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.

Written Communication (6 Credits Required)

Recommended Course: ENG 1010 - Composing Arguments (3)

Recommended Course: ENG 1020 - Research & Argument Writing

Oral Communication (3 Credits Required)

Select one course from Oral Communication course list (3)

Quantitative Literacy (3 Credits Required)

Recommended Course: MTH 1120 Trigonometry (3)

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)

Recommended Course: PHY 2010 College Physics I (4)

Recommended Course: PHY 2030 College Physics I Lab (1)

Recommended Course: PHY 2040 College Physics II Lab (1)

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:
(33) Credit Hours; (3) Upper Division**

**TOTAL UPPER DIVISION: 40
TOTAL UPPER DIVISION HOURS: 120**

Robotics 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)

CS 1400 Computer Organization 1 (4)

CSS 2751 - Principles of Cybersecurity (3)

CSS 3753 Computing & Security for Manufacturing (3)

EET 1001 - Electronics: An Introduction (3)

EET 2000 Electric Circuits & Machines (3)

EET 2350 Advanced Technical Programming (3)

EET 3010 Industrial Electronics (4)

EET 3370 Digital Circuits for Advanced Manufacturing (3)

OR EET 3380 Technical Programming for Advanced Manufacturing (3)

EET 3410 Electric Machines (3)

EET 3740 Programmable Logic Controllers (2)

EET 4730 Robotics (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 3330 Robotics for Manufacturing (3)

MET 3630 - Lean Manufacturing Systems Engineering (3)

MET 4080 Computer Aided Manufacturing (3)

MTH 1410 Calculus I (4)

MTH 2410 Calculus II (4)

PHY 2020 College Physics II (4)

PHY 2040 College Physics II Lab (will fulfill GS Natural & Physical Sciences Requirement)

**Robotics Courses:
(87) Credit Hours; (37) Upper Division**

Academic Plan - Robotics

<p><u>Semester 1 - Fall</u></p> <ul style="list-style-type: none"> ○ ENG 1010 Composing Arguments (3) (GS) ○ Oral Communication (3)(GS) ○ Art and Humanities (3) (GS) ○ Quantitative Literacy MTH 1120 College Trigonometry (3) ○ AMS 1010 Survey of Advanced Manufacturing & Workplace Prep (3) <p>Total Credit Hours 15</p>	<p><u>Semester 2 - Spring</u></p> <ul style="list-style-type: none"> ○ ENG 1020 Research and Argument Writing (3) (GS) ○ Historical (3) (GS) ○ Art and Humanities (3)(GS) ○ MET 1010 (3) Manufacturing Processes (3) <u>OR</u> IND 2830 Manufacturing Materials & Processes (3) ○ MTH 1410 - Calculus I (4) <p>Total Credit Hours 16</p>
<p><u>Semester 3 - Fall</u></p> <ul style="list-style-type: none"> ○ Natural & Physical Sciences (3) (GS) <p>Recommended Course: PHY 2010 College Physics I (4) Recommended Course: PHY 2030 College Physics I Lab (1)</p> <ul style="list-style-type: none"> ○ CS 1030 Computer Science Principles (4) ○ MET 1200 Technical Drawing I (3) <u>OR</u> IND 1450 Technical Drawing and CAD (3) <u>OR</u> CET 1215 Engineering Graphics (3) ○ EET 1001 Electronics: An Introduction (3) ○ JMP 2610 Introduction to Technical Writing (3) <p>Total Credit Hours 18</p>	<p><u>Semester 4 - Spring</u></p> <ul style="list-style-type: none"> ○ Natural & Physical Sciences (3) (GS) <p>Recommended Course: PHY 2020 College Physics II (4) Recommended Course: PHY 2040 College Physics II Lab (1)</p> <ul style="list-style-type: none"> ○ CS 1400 Computer Organization I (4) ○ MET 1310 Principles of Quality Assurance (3) ○ MTH 2410 Calculus II (4) <p>Total Credit Hours 16</p>
<p><u>Semester 5 - Fall</u></p> <ul style="list-style-type: none"> ○ CSS 2751 Principles of Cybersecurity (3) ○ EET 2000 Electric Circuits and Machines (3) ○ EET 2350 Advanced Technical Programming (3) ○ MET 2010 CNC Machining and Inspection (3) ○ MET 3000 Manufacturing Analysis (4) <p>Total Credit Hours 16</p>	<p><u>Semester 6 - Spring</u></p> <ul style="list-style-type: none"> ○ CSS 3753 Computing & Security for Manufacturing (3) ○ EET 3010 Industrial Electronics (4) ○ EET 3370 Digital Circuits for Advanced Manufacturing (3) <u>OR</u> EET 3380 Technical Programming for Advanced Manufacturing (3) ○ MET 3330 Robotics for Manufacturing (3) ○ Social and Behavioral Sciences (3)(GS) <p>Total Credit Hours 16</p>
<p><u>Semester 7 - Fall</u></p> <ul style="list-style-type: none"> ○ Social and Behavioral Sciences (3)(GS) <p>Recommended Course: CET 3120 Engineering Economy (3)</p> <ul style="list-style-type: none"> ○ AMS 3010 Additive Manufacturing Stratasys Certification Preparation (3) ○ EET 3740 Programmable Logic Controllers (2) ○ MET 3630 Lean Manufacturing Systems Engineering (3) <p>Total Credit Hours 11</p>	<p><u>Semester 8 - Spring</u></p> <ul style="list-style-type: none"> ○ AMS 4950 Senior Experience Professional Internship (3) ○ EET 3410 Electric Machines (3) ○ EET 4730 Robotics (3) ○ MET 4080 Computer Aided Manufacturing (3) <p>Total Credit Hours 12</p>