

# MPT - MANUFACTURING AND PRODUCTION TECHNOLOGY

## **MPT 101 - Basics of Operations and Maintenance** **Units: 3**

This will be an introductory course for practical understanding of automation systems and common maintenance practices. This course satisfies 10 embedded hours toward specified programs and certificates for AAS Human Relations General Education requirements, 5 embedded hours toward specified programs and certificates for AAS Math General Education requirements, and 5 embedded hours toward specified programs and certificates for AAS Science General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

## **MPT 102 - Introduction to Programming for Mechatronics** **Units: 3**

This course will introduce students to the necessary skills to program mechatronic production equipment. This course satisfies 20 embedded hours toward specified programs and certificates for AAS Science General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

## **MPT 104 - Introduction to IIoT, Networking and Data Analytics** **Units: 6**

This course will introduce students to concepts related to industry 4.0 such as IIoT, networking, and data analytics. This course satisfies 5 hours of embedded Human Relations and 25 hours of embedded Science for the AAS.

*Transferability: May not transfer towards an NSHE bachelor's degree*

*Enrollment Requirements: Completion of MPT 102 or instructor approval.*

## **MPT 110 - Automated Production Concepts I** **Units: 3**

This course is an introduction to the concept of industry 4.0: the fourth iteration of industrial revolution. This course satisfies 10 embedded hours toward specified programs and certificates for AAS Human Relations General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

*Term Offered: All Semesters*

## **MPT 111 - Fundamentals of Manufacturing and Automation I** **Units: 3**

This course serves as a broad introduction to foundational theories and concepts in automation and manufacturing. This course satisfies 15 embedded hours toward specified programs and certificates for AAS Human Relations General Education requirements, 15 embedded hours toward specified programs and certificates for AAS Math General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

## **MPT 112 - Fundamentals of Manufacturing and Automation II** **Units: 3**

This course will cover a broad range of topics relevant to the field of manufacturing. This course is a continuation of MPT 111 and will go into greater depth on topics covered there as well as explore new subjects. This course satisfies 15 embedded hours toward specified programs and certificates for AAS Math/Quantitative Reasoning General Education requirements as well as 5 embedded hours toward specified programs and certificates for AAS Human Relations General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

*Enrollment Requirements: Prerequisite: MPT 111 or instructor approval.*

## **MPT 114 - Fundamentals of Manufacturing and Automation III** **Units: 3**

This course will provide an introduction to a wide range of topics regarding Industry 4.0 such as Manufacturing Execution Systems (MES), asset tracking devices, and data analytics.

*Transferability: May not transfer towards an NSHE bachelor's degree*

*Enrollment Requirements: MPT 112 or instructor approval.*

## **MPT 120 - Automated Production Concepts II** **Units: 3**

This course will focus on multiple components of Industry 4.0 at an introductory-intermediate level. Topics will include smart sensors and their relation to industry 4.0. This course satisfies 5 embedded hours toward specified programs and certificates for AAS Human Relations as well as 5 embedded hours toward specified programs and certificates for AAS Science General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

*Term Offered: All Semesters*

## **MPT 130 - Automated Production Concepts III** **Units: 3**

This course will serve as an introductory-intermediate course that focuses on how to operate various equipment germane to industry 4.0. Topics will include Manufacturing Execution Systems (MES), Human Machine Interfaces (HMI), data security, and 3D modeling. This course satisfies 5 embedded hours toward specified programs and certificates for AAS Human Relations as well as 5 embedded hours toward specified programs and certificates for AAS Science General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

*Term Offered: All Semesters*

## **MPT 135 - Material Handling** **Units: 2**

This course will cover various forms of material handling including powered and non-powered equipment. This course will teach to standards set by the Occupational Safety and Health Administration. This course satisfies 5 embedded hours toward specified programs and certificates for AAS Human Relations General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

*Term Offered: All Semesters*

## **MPT 140 - Quality Control** **Units: 3**

This course introduces students to the fundamental principles and practices of industrial quality control. Total Quality Management (TQM), LEAN Manufacturing, Acceptance Sampling Systems, and Continual Improvement are discussed in depth. This course satisfies 24 hours of instruction toward completing the embedded human relations curriculum requirements and also satisfies 15 hours of instruction toward completing the embedded math curriculum requirements, in accordance with Embedded Curriculum Guidelines Option A.

*Transferability: May not transfer towards an NSHE bachelor's degree*

*Term Offered: All Semesters*

## **MPT 160 - Mechanical Drive Systems I** **Units: 3**

This is an introductory course for mechanical systems. Topics will include mechanical drives and alignment. This course satisfies 10 embedded hours toward specified programs and certificates for AAS Human Relations, 5 embedded hours toward specified programs and certificates for AAS Math, and 5 embedded hours toward specified programs and certificates for AAS Science General Education requirements.

*Transferability: May not transfer towards an NSHE bachelor's degree*

<b>MPT 165 - Customer Service for Technicians</b> Units: 1-3	<b>MPT 340 - Computer Simulations and Analysis</b> Units: 4
This course is focused on effective communication and customer service skills for a technical environment. It will focus on common oral and written communication opportunities where attaining mutual understanding and agreement between product/service providers and customers is essential for smooth business operation and customer satisfaction. <i>Transferability: May not transfer towards an NSHE bachelor's degree</i>	This course will provide students with a practical knowledge and understanding of production simulation methods used in context of Industry 4.0. Advanced 3-D modeling software applications will be utilized in the development and implementation of virtual manufacturing scenario. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.</i>
<b>MPT 170 - Manufacturing Assembly - Identifying and Properly Utilizing the Correct Tools for the Job</b> Units: 3	<b>MPT 343 - Design and Manufacturing Process II</b> Units: 3
The course will provide training in basic hand tool identification; 5S (Sort, Set in Order, Shine, Standardize, Sustain) principles and practices; selecting the correct tools for the job; and demonstrating proper tool usage through various hands-on assembly projects. <i>Transferability: May not transfer towards an NSHE bachelor's degree</i>	The course will provide students with a thorough understanding of manufacturing processes and design. Topics covered include; equipment design, automation/control, quality, product design for manufacture-ability, industrial management, and systems design and operation. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.</i>
<b>MPT 198 - Special Topics in Manufacturing and Production Technologies</b> Units: 0.5-4	<b>MPT 351 - 3D Vision Technology</b> Units: 3
This course is designed to give students a basic understanding of current theories in manufacturing and production technologies. As local manufacturers begin to utilize advanced technologies in their processes, this course will provide a hands on approach to learning the technology in these areas necessary for students to succeed in the new economy. <i>Transferability: May not transfer towards an NSHE bachelor's degree</i>	This course provides an overview in the fundamentals of image processing for 3-D vision technology applications specifically associated with manufacturing processes. Image formation and filtering; 3D visual reconstruction, camera calibration, image classification, and object recognition will be covered in depth. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.</i>
<b>MPT 305 - Introduction to System Dynamics</b> Units: 3	<b>MPT 363 - Manufacturing Execution Systems</b> Units: 4
This course is an introduction to mathematical modeling and simulation of systems including mechanical, electrical, electro-mechanical, fluid and thermal systems. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program and MATH 126.</i>	This course provides an in-depth look into the design and operation of a production process. Students will evaluate central control systems and the theoretical basics of production planning and control. Classical lean methods for process analysis will be presented along with hands-on analysis of the data collected by a Manufacturing Execution System (MES) control system for the Cyber-Physical Factory. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.</i>
<b>MPT 311 - Laser Scanning Methods / Techniques</b> Units: 3	<b>MPT 411 - Advanced Machine Vision Integration</b> Units: 4
The course provides an extensive look at laser scanning methods utilized with advanced manufacturing for product identification, and product design. One-dimensional, two-dimensional, and three-dimensional scanning methods are examined throughout the course. Galvanometer-based optical scanners will be covered as well as other types of laser scanners. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.</i>	This course provides an extensive study of machine vision system components, operation, design, and integration into advanced manufacturing applications. Students will analyze and identify machine vision systems requirements to enhance various manufacturing operations. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science Cyber-Physical Manufacturing program and MPT 325.</i>
<b>MPT 312 - Industry 4.0 / Cyber Physical Manufacturing</b> Units: 3	<b>MPT 412 - Advanced Digital Inspection</b> Units: 3
This course provides a comprehensive and in-depth introduction to fourth industrial revolution (Industry 4.0) technologies and applications. The challenges and benefits attributed to the fourth industrial revolution; the effects on organizations; and future of the manufacturing workforce be will covered. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.</i>	This course is a continuation in the study and application of artificial vision technologies. Students will utilize advanced techniques and applications with a focus on image processing to provide visual feedback and image interpretation critical for part inspection, robotic guidance and automated manufacturing processes. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program and MPT 325.</i>
<b>MPT 325 - Digital Inspection / Quality Control</b> Units: 4	<b>MPT 415 - Simulation of Manufacturing Systems</b> Units: 4
This course introduces students to artificial vision technology that connects cameras and computers to provide visual feedback and image interpretation critical for part inspection, robotic guidance and industrial automation processes. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.</i>	The course is a continuation into the study of manufacturing simulation models in context of Industry 4.0. Emphasis will be placed on the role of computers in the practice of simulation modeling for decision making. Students will use data driven analysis to analyze potential issues regarding product flow, production throughput, and product manufacturability. <i>Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program and MPT 325.</i>