

# MANUFACTURING AND PRODUCTION TECHNOLOGY (MPT)

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

This course introduces students to the concepts of production systems management and control. This course stresses materials resource planning and basic production line controls, to include robotic, conveyor, machine tool, and quality integration. Completion of this course (total 3 Units), satisfies 10 hours of instruction toward completing the embedded human relations curriculum requirements, in accordance with Embedded Curriculum Guidelines Option A. Completion of this course (total 3 Units), 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 120 - Automated Production Concepts II** **Units: 3**

This course introduces students to the concepts of production systems management and control. This course stresses materials resource planning and basic production line controls, to include robotic, conveyor, machine tool, and quality integration. This course satisfies 12 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*  
*Enrollment Requirements: Prerequisite: MPT 110 and ELM 134, or instructor approval.*  
*Term Offered: All Semesters*

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

This course is a further continuation of Automated Production Concepts I & II which explores the world of Photonics and the application, construction & operation of Lasers across multiple industries.

*Transferability: May not transfer towards an NSHE bachelor's degree*  
*Enrollment Requirements: Prerequisite: MPT 120.*  
*Term Offered: All Semesters*

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

This course provides an overview of the functions and operation of various types of common powered and non-powered industrial material handling equipment. OSHA regulations and standards governing the safe use of powered industrial trucks are covered. The student must complete all content for the following four areas in order to meet degree or certificate requirements. 1. Basic Material Handling Equipment 2. Safe and Effective Equipment Operation 3. Warehouse Procedures 4. Automated Warehouse Concepts Completion of all four areas (total of 2 credits), satisfies 6 hours of instruction toward completing the embedded human relations 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 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 course covers the basic and intermediate principles and practices of mechanical drive systems used in industry. Students will learn proper installation, troubleshooting, repair and maintenance techniques; of Mechanical Drive Systems such as Belt, Chain, and Gear Drives.

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

## **MPT 165 - Customer Service for Technicians** **Units: 1-3**

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.

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

## **MPT 198 - Special Topics in Manufacturing and Production Technologies** **Units: 0.5-4**

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.

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

## **MPT 305 - Introduction to System Dynamics** **Units: 3**

This course is an introduction to mathematical modeling and simulation of systems including mechanical, electrical, electro-mechanical, fluid and thermal systems.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program and MATH 126.*

## **MPT 311 - Laser Scanning Methods / Techniques** **Units: 3**

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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.*

## **MPT 312 - Industry 4.0 / Cyber Physical Manufacturing** **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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.*

**MPT 325 - Digital Inspection / Quality Control** **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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.*

**MPT 340 - Computer Simulations and Analysis** **Units: 4**

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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.*

**MPT 343 - Design and Manufacturing Process II** **Units: 3**

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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.*

**MPT 351 - 3D Vision Technology** **Units: 3**

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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.*

**MPT 363 - Manufacturing Execution Systems** **Units: 4**

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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program.*

**MPT 411 - Advanced Machine Vision Integration** **Units: 4**

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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science Cyber-Physical Manufacturing program and MPT 325.*

**MPT 412 - Advanced Digital Inspection** **Units: 3**

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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program and MPT 325.*

**MPT 415 - Simulation of Manufacturing Systems** **Units: 4**

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.

*Enrollment Requirements: Prerequisite: Admissions to the Bachelor of Applied Science, Cyber-Physical Manufacturing program and MPT 325.*