

# **Virginia Western Community College**

## **IND 230**

### **Introduction to Basic Computer Integrated Manufacturing**

#### **Prerequisites**

**MEC 128** -Introduces foundational software tools in engineering technology. Teaches software design for mechanical and electrical systems, and high-level language microcomputer programming. Covers software communication skills in word processing, spreadsheet analysis, slide deck presentations, and cloud-based storage. Apply software tools to technology labs and projects

#### **Corequisites**

#### **Course Description**

Studies principles of inspection and quality assurance with emphasis on statistical process control. May include the setting up, maintaining, and interpreting of control charts, and review of basic metrology. Quality within an organization is driven by the needs of customers. All members of the company demonstrate quality in how they carry out the processes to create and deliver its products and services. This class will address the many facets that contribute to quality. The content is for individuals who must understand the importance of quality and take steps toward improving the practice of quality. Content covers standards, auditing, and improvement for all levels in industry.

**Semester Credits: 3 Lecture Hours: 2 Lab Hours: 2**

#### **Required Materials**

##### **Textbook:**

##### **Software:**

##### **Other Required Materials:**

Tooling University, online subscription, purchased through Tooling U bookstore(online) to receive student discount

## Course Outcomes

At the completion of this course, successful students will be able to

- Identify how each department and function of a company plays a role in producing quality products for the customer.
- Identify and describe the key components of the ISO 9000:2000 standard.
- Understand the maintenance profession and describes various approaches to the practice of maintenance.
- Describe the basic principles of lean manufacturing and compare them to traditional manufacturing approaches.
- Describe the flow of products and information in a supply chain and explain the importance of customer service.
- Describe the elements of Total Productive Maintenance (TPM) and explains how TPM helps reduce losses and waste.
- Understand the 5S quality system and describe techniques for implementing 5S.
- Understand the basics of cellular manufacturing, including the characteristics of cells and pull systems.
- List basic concepts of Six Sigma, including data analysis, types of variation, common and special causes, the roles of Six Sigma team members, and the DMAIC method.
- Understand the troubleshooting process and describe basic steps for identifying problems.
- Discuss ways to identify, implement, and document effective solutions in the troubleshooting process.
- Describe the steps of the internal auditing process and explains effective approaches for conducting audit interviews.
- Describe the main concepts of statistical process control and explains how to recognize processes that are affected by special causes.
- Compare ISO 9001:2000 and TS 16949:2002 and explains how their differences affect the standard operating procedures in a quality management system.
- Describe the most common metrics used to measure timing, error, and costs and encourage continuous improvement in a lean system.
- Understand the purpose and methods of flow charting, including spaghetti diagrams, process maps, and value stream maps.
- Understand different strategies for reducing setup times, including ideas for streamlining operations and tactics for pre-staging processes.
- Discuss the concept of total quality, as well as methods of implementing and measuring TQM within a company's structure.
- Describe the sequence of steps for conducting kaizen events and explains common areas for process improvement.
- Describe the elements used to create a value stream map and covers how to

create a value stream map of the present state.

- Understand strategies commonly used to create a future state value stream map based on findings from a present state value stream map.
- Understand the Six Sigma DMAIC process improvement method and its primary goals, including the most common sub-steps and frequently used tools.

## Topical Description

- Lean Manufacturing Overview
- Continuing Process Improvement Managing Flow
- Continuing Process Improvement Eliminating Waste
- Overview of 5S terminology
- Cell Design and Pull Systems
- Introduction to Six Sigma
- Conducting Kaizen Events
- SPC Overview
- Metrics for Lean Manufacturing
- Process Flow Charting
- Strategies for Setup Reduction
- Management Tools
- Value Stream Mapping
- Maintaining a Lean Culture
- ISO 9001:2015
- Process Design and Development
- Product Design and Development
- Equipment/Tool Design and Development
- TS 16949:2009
- Troubleshooting

## Notes to Instructors

Beginning Fall 2020, VWCC will require students to have a computer or reliable access to a computer, capable of participation in an online format. Online courses at Virginia Western require a significant amount of interaction with Canvas, the Learning Management System, and many require real-time class sessions using the Zoom web-conferencing tool. To be successful in online classes, students must have substantial access to a computer with hi-speed internet connectivity. The expected requirements are listed on the college webpage.

[TITLE IX STATEMENT](#)

[ADA STATEMENT](#)