PMET 131: TOOLING AND MACHINING

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2023
Credits:	3
Total Contact Hours:	90
Lecture Hours :	36
Lab Hours:	54
Hours Arranged:	0
Outside of Class Hours:	72
Total Student Learning Hours:	162
Prerequisite:	PMET 130.
Strongly Recommended:	ENGL 101, BUS 130.
Transferable to CSU:	No
Transferable to UC:	No
Grading Method:	Standard Letter

Catalog Course Description

This course will explore four parts of the tooling and machining process which include an introduction to manufacturing, metal machining, Computer Numerical Control (CNC),and advanced machining technologies. Students will have a good understanding of how to read and interpret Computer Aided Design (CAD) drawings for the purpose of production with CNC mills and may include some hand operated metal machining tools. After students have designed and managed a part for production, he/she will make their designed part out of aluminum in a CNC mill with the proper Mastercam programming and tool set up. 36 lecture hours, 54 lab hours.

Course Objectives

- Students will analyze and develop a production plan from concept design in CAD to production on a CNC mill with the use of manufacturing theories and concepts such as Six Sigma/Lean Production models to support the manufacturing of an aluminum part or sub/supporting component

Major Course Content

- CAD drawing analysis and data collection to support a product concept and the planning of production in a large or micro scale
- Production planning and design with lean production concepts, theories, and physical attributes, i.e., Kanban or pull vs. push systems
- Tooling and machining required to produce a part or sub component for proof-of-concept, testing, ergonomics, and esthetic inspections and purposes
- Tooling also required for reverse engineering components for specifications and precision measurements required
- CNC mill program and operations

Lab Content

- CAD drawing analysis with Solidworks software and part engineering drawings
- Gathered economics data and statistics on raw material, lean production designs and blueprints for a Kanban system when required for production on a mass or micro scale
- Tools will be used for reverse engineering and analyzing parts will include, but not limited to micrometers, dial calipers, height gauges, dial bore gauges, cc'ing fluid, buret, and related materials to analyze the volume of an area, straight edges, machinists rulers, and squares.
- CNC mill used for programming and final product made out of aluminum with the proper tools, speed rates, safety precautions, and materials needed

Suggested Reading Other Than Required Textbook

Donohue, Wesley E., Unlocking Lean Six Sigma: A Competency-Based Approach to Applying Continuous Process Improvement Principles and Best Practices (Competency Based Books for Structured Learning)

Examples of Required Writing Assignments

Technical write up and report on data gathered to be presented and proposed to the team for approval of production

Examples of Outside Assignments

Research and development necessary to plan a lean production process with an effective amount of data on market economics and targeted end-user requirements

Instruction Type(s)

Lab, Lecture

IGETC Area 1: English Communication

1A. English Composition, 1C. Oral Communication, 1B. Critical Thinking/ English Comp

IGETC Area 4: Social and Behavioral Sciences

4B. Economics