COURSE TITLE: M.E. 37 Manufacturing processes

CATALOG DESCRIPTION
Principles of manufacturing processes in the area of metal removal, forming, joining and casting and fundamentals of numerical control. Study includes applications of equipment, e.g. lathe milling machine, drill press, saw grinder, welder, molding equipment and core makers. Emphasis on safety during hands on operations. Two hours lecture, one three hour lab 3 units

GOALS:
Understanding the fundamentals of basic manufacturing processes. Students will understand the type of parts that can be produced by common processes, the resulting tolerances and have the knowledge to select appropriate processes for different components in a design. Students will also gain insight into the operation of typical manufacturing plants. Basic familiarity with common machine shop practices.

MEASUREMENT: Student performance is measured using the standard CSUS grading scale, A-F. Students must earn a C- or better in ME 37 to complete the course. Measurement of the extent to which each objective is met is done using standard tools (homework, exams, and lab projects). The final exam is comprehensive. The specific tools are homework and exams for the lecture portion of the course and projects for the lab section.

OBJECTIVES: By the end of the course a student should be able to:
Lecture: Explain and describe basic manufacturing methods including
- Casting, green sand casting, die casting, and investment casting (exam)
- Cold and hot working of metals (exam); Welding and cutting (exam); Forging (exam)
- Press work (exam); Machining including CNC (exam); Threading (exam)
- Grinding (exam); Plastic injection molding and composite fabrication (exam)
- Compare the advantages and disadvantages of different processes (exam)
- Identify parts made by specific processes (exam)
- Explain the basis of modern quality control systems (exam)
- Identify and explain the use of basic measuring tools (lab, exam)
- Explain the use of statistical process control and use SPC charts (homework, exam)
- Identify commonly used cutting tools and do simple feed and speed calculations (homework, exam)
- Correctly select tap drill size and depth from drawings and charts (lab, exam)

Lab: Perform simple tuning and drilling operations on the lathe
- Measure parts using a micrometer and scale
- Understand simple engineering drawings and tolerances
- Operate a drill press and drill holes using drill jigs
- Perform simple milling operations
- Read and correctly adjust cross feed on the lathe and mill
- Name the major parts of the lathe and mill and explain their operation (exam)
- Make a simple green sand mold
- Perform edge and corner welds using OAW
- Perform fillet welding using GMAW
- Identify basic machine tools and explain their operation (exam)
- Successfully complete two lab projects using these skills

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