Machine shop / Manufacturing Projects

One of the major objectives of this course is for each student to complete a manufacturing project in which they will use the CAD software to actually create and produce a useful functioning mechanical system or component. Each Mechanical system will be an assembly of several parts. The parts of the mechanism must fit together accurately for the component to perform its intended function. The majority of the parts will be manufactured using basic hand and power tools available in the student machine shop. Other auxiliary equipment may be used for certain portions of the fabrication by the machine shop technician in the presence of the students. Students will work in groups of 4 per project.

Due to the limitation in equipment and time students will receive the sketches of each part of the project and will be required to generate the CAD solid models, the drawings and the assembly. Since the goal of this part of the course is practical hands-on training, the bulk of the project should utilize lathe and mill and press drill machine operations. Before starting with the manufacturing of the project, students will receive basic hands-on training on the lathe and mill machines. Students are highly encouraged to work with the machinists in the engineering lab and to perform as many manual machining operations their self.

The following tasks are required for completion of the project:

1. Fully document the specifications of each part of your component using SolidWorks. This will include properly dimensioned drawings, including tolerances, for each part of the assembly, assembly drawings, a bill of materials and a cost estimate.

2. Develop process plans for manufacturing each part of your component.

3. Work in the machine shop to fabricate your parts.

4. Document the processes used to manufacture the components, including sketches and/or photos of the actual processes.

5. Prepare a final report that documents the tasks and steps for completion of your project.
Suggested Project:

1. Kant-Twist Clamp