



## Engineering SLOs

### **IDE 120 – Introduction to CAD**

1. Develop a portfolio of industry standard drawings in CAD.
2. Evaluate software for effectiveness in drawing appropriate scales on drawings.
3. Create CAD drawings and 3D models using given specifications.
4. Create an efficient sketch using correct origin placement, geometric relations, and symmetry.
5. Select correct primary view and create a fully dimensioned print according to drafting standards and best practices.

### **IDE 250 – Product Design and Viability**

1. Create cost benefit analyses of common vs. sustainable materials processes for product manufacturing.
2. Design or re-design a prototype for a product according to manufacturing constraints.
3. Generate engineering prints and bill of materials (BOM) for the proposed product.
4. Fabricate prototypes using most appropriate processes and materials effectively.
5. Source the most appropriate and cost-effective purchased part to address a particular design goal.

### **IDE 220 – Advanced CAD**

1. Apply CAD surface modeling techniques to develop mold designs and prototypes.
2. Create a useful CAD model from one or more scanned sketches.



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## Student Learning Outcomes

### **IDE 170 – Introduction to Prototyping**

1. Construct proof of concept, presentation and prototype models from concept sketches and CAD models.
2. Use rapid prototyping technologies to create models and molds from digital CAD files.
3. Evaluate structural and aesthetic merits of design proposals and compare with other approaches to the same problem.
4. Construct prototype models using common prototyping methods and technologies.
5. Generate a tool path sufficient to cut out a part profile using a CNC router.

### **IDE 270 – Manufacturing Processes and Materials**

1. Design parts or assemblies appropriate to a particular manufacturing process and associated material.
2. Analyze and propose manufacturing approaches based on project aesthetic, structural, and manufacturing requirements.
3. Propose prototyping scenarios to create visual study and/ or functional prototype models that closely represent the actual production and design intent.
4. Compare advantages and limitations of various manufacturing processes and materials.
5. Create a comprehensive portfolio of professional quality.

### **IDE 150 – Design Foundation II**

1. Develop concept sketches and presentations.
2. Explain design criteria for existing products.
3. Use appropriate typography and color theory principles and tools effectively.
4. Develop and construct a sketch model to meet specific criteria at a specific dimensional scale.



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## Student Learning Outcomes

5. Organize various elements in a useful and visually appealing way using the Gestalt principles of design.

### **IDE 230 – Introduction to Mechanical Principles**

1. Evaluate off-the-shelf components and devices in terms of their mechanical purpose and match component and device specifications with design requirements.
2. Integrate existing components and devices into mechanical design solutions.
3. Design CAD based mechanical devices that demonstrate a common mechanical principle.

### **IDE 210 – Advanced Media**

1. Explain and justify design concepts and rationale.
2. Evaluate design proposals in the context of design history.
3. Graphically represent a product concept.
4. Create a unified, visually compelling portfolio of their work.

### **IDE 160 – Intermediate CAD**

1. Graphically represent technical designs, using accepted standard practices.
2. Create 3D models and the necessary views for production.
3. Develop drawings using parametric solid modeling technology.

Source: [Mt. San Antonio College](#)