I. **OVERVIEW**

*The following information will appear in the 2010 - 2011 catalog*

**ENGTC 215 Introduction to Solid Modeling**  
1 Unit

Introduction to use of the solid modeling software. Topics include working in the sketch environment, solids construction, solids editing, drawing views, dimensioning, and assemblies.

Field trips are not required. (A-F or P/NP - Student choice) Lecture /Lab

Transfer: (CSU)

II. **LEARNING CONTEXT**

*Given the following learning context, the student who satisfactorily completes this course should be able to achieve the goals specified in Section III, Desired Learning:*

A. **COURSE CONTENT**

1. **Required Content:**

   a. Introduction to solid modeling

      i. History of wire frame, surface and solid modeling software

      ii. Use of solid modeling software in industry

      iii. Parametric modeler characteristics

      iv. Part modeling approach

      v. Sketch features versus applied features

   b. User interface

      i. Principle planes

      ii. Coordinate system

      iii. View manipulation - zoom, pan, shade, rotate

   c. Creating sketch profiles

      i. Use of 2D tools (lines, circles, arcs, etc) for creating sketches.

      ii. Use of 2D modification tools (trim, extend, mirror, etc) for modifying sketches.

      iii. Use of 2D element constraints/relations.

   d. Creating 3D solids

      i. Selection/creation of sketch planes
ii. Feature creation tools
   a. Extrude
   b. Revolved extrude
   c. Extruded cut
   d. Sweep
   e. Hole wizard

iii. Applied feature tools
   a. Fillet
   b. Chamfer
   c. Mirror

iv. End conditions
v. Editing models

 e. Creating part drawings
   i. Drawing standards
   ii. Dimensioning rules
   iii. Creating templates
   iv. Creating views
   v. Manipulation and modification of views
   vi. Adding dimensions

f. Creating assemblies
   i. Placing parts
   ii. Adding/modifying relationships

2. ** Required Lab Content:**

   In lab, students perform the CAD functions listed in the lecture content section. Assignments are given that require application of the content.

   a. Introduction to solid modeling
      i. History of wire frame, surface and solid modeling software
      ii. Use of solid modeling software in industry
iii. Parametric modeler characteristics

iv. Part modeling approach

v. Sketch features versus applied features

b. User interface

i. Principle planes

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i. Use of 2D tools (lines, circles, arcs, etc) for creating sketches.

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B. HOURS AND UNITS  

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C. METHODS OF INSTRUCTION (TYPICAL)  
Instructors of the course might conduct the course using the following method:  
1. Demonstrations of efficient techniques of solid modeling commands  
2. In-class discussion and one-to-one discussion by students with instructor and other students  

D. ASSIGNMENTS (TYPICAL)  
1. EVIDENCE OF APPROPRIATE WORKLOAD FOR COURSE UNITS  
   Time spent on coursework in addition to hours of instruction (lecture hours)  
   Weekly assignments that require the use of SolidWorks to create 3D models, part drawings and assemblies.  
2. EVIDENCE OF CRITICAL THINKING  
   Assignments require the appropriate level of critical thinking  
   a. Students will be asked to create 3D models using SolidWorks features. The students will be given dimensioned parts to reproduce in the software. Students will have to determine the necessary tools and techniques to create the models.  
   b. Students will have to assemble multi-part assemblies by determining the necessary tools and techniques.  
   c. Part drawings will have to be created in the drawing environment. Students will be given drawings to reproduce, first by creating a 3D model.  

E. TEXTS AND OTHER READINGS (TYPICAL)  
1. Other: No textbook required.  

III. DESIRED LEARNING
A. **COURSE GOAL**

As a result of satisfactory completion of this course, the student should be prepared to:

use basic features in a mechanical solid modeling program to create mechanical parts, prepare part drawings and create assemblies.

B. **STUDENT LEARNING GOALS**

Mastery of the following learning goals will enable the student to achieve the overall course goal.

1. **Required Learning Goals**

   Upon satisfactory completion of this course, the student will be able to:

   a. Execute the SolidWorks commands and directions discussed in a laboratory setting. See "Lab Student Learning Goals" for details.

2. **Lab Learning Goals**

   Upon satisfactory completion of the lab portion of this course, the student will be able to:

   a. Explain the role of solid modeling in the field of engineering and product design.
   b. Use zoom, pan, rotate to manipulate the view of parts and assemblies.
   c. Create/modify fully-defined 2D sketch profiles.
   d. Apply constraints/relationships in 2D sketch profiles.
   e. Create solid models using feature creation tools.
   f. Use assembly relationships to create multi-part assemblies.
   g. Create multi-view, associative part drawings.
   h. Create auxiliary and section views.
   i. Apply dimensions to part views according to drawing standards.

IV. **METHODS OF ASSESSMENT (TYPICAL)**

A. **FORMATIVE ASSESSMENT**

   1. Weekly grading of instructor-assigned CAD models, drawings and assemblies.

B. **SUMMATIVE ASSESSMENT**

   1. Final project assignment