ABE 221, Introduction to Computer Aided Design

Credits and Contact Hours:
3 credits, Three 2-hours help session per week hybrid course
Online office hour as needed using GoToMeeting

Instructor's or course coordinator's name:
Muluneh Yitayew

Textbook, title, author and year:
Engineering Design and Graphics with SOLIDWORKS 2014.
James D. Bethune. Printice Hall, Pearson. 2015.
Engineering Design with SOLIDWORKS 2014 and Video
Instruction. David C. Planchard. SDC Publications.

Other Supplemental materials:
Instructional Videos

2015-2016 Catalog Description:
Introduction to computer aided design concepts and techniques. Two and three-dimensional drawing presentation, methods of graphical communications, data analysis, design synthesis and production methods.

Prerequisites:
None

Co-requisites:
None

Required, Elective, or Selected Elective:
Required

Instruction Outcomes:
1. Understanding of parametric modeling
2. Understanding of the use of sketch and features tools in SOLIDWORKS
3. Ability to create and interpret orthographic views
4. Ability to create assembly drawings and document assemblies.
5. Ability to create and design with threads and fasteners.
6. Understanding of dimensioning shapes and features.
7. Understanding of both linear and geometric tolerances.
8. Ability to create gears using SOLIDWORKS toolbox
9. Understanding of printing the model created engineering drawing and design in to a prototype using 3D printing.

Student Outcomes – Listed in Criterion 3 or any other outcomes are addressed by the course:	**Learning outcome (c)** Can design a system, component or process to meet desired needs within realistic constraints: 1,4,5,7,8 **Learning outcome (k)** an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice: 1-9
Topics covered:	This course provides sophomores and juniors in ABE and other engineering disciplines with the ability to use parametric models in design and prototyping of systems..

1. **Sketch Entities and Tools**
   Creating 2D sketches, Using the sketch tools, Creating complex shapes by combining individual sketch tools
2. **Features**
   Feature tools, Drawing 3D objects, Using features to create objects.
3. **Orthographic Views**
   Use two-dimensional views to define a three-dimensional model, ANSI standards and conventions, Drawing section and auxiliary views.
4. **Assemblies**
   Creating assembly drawings, Create an exploded assembly drawings, Creating a part list, Animation of assembly, and Edit title block.
5. **Threads and Fasteners**
   Thread terminology and conventions, Draw threads, Size both internal and external threads, Use standard-size threads, Use and size washers, nuts, and screws.
6. **Dimensioning**
   Dimensioning objects, ANSI standards and conventions, Dimensioning different shapes and features, and Fundamentals of 3D dimensioning
7. **Tolerancing**
   Tolerance conventions, Defining tolerances, Apply tolerances, Geometric tolerances, and Positional tolerances
8. **Gears**
   Concept of power transmission, Fundamentals of gears, Drawing and animating gears.
9. **3D Printing**
   Developing a model for printing, Converting file format, Use the driver software, Filament types and use, Issues with 3D printing.