Virginia Western Community College
CAD 242
Parametric Solid Modeling II

Prerequisites
CAD 111- Introduces technical drafting from the fundamentals through advanced drafting practices. Teaches lettering, metric construction, technical sketching, orthographic projection, sections, intersections, development, fasteners, theory and applications of dimensioning and tolerances. Includes pictorial drawing, and preparation of working and detailed drawings.

Corequisites
CAD 241- Focuses on teaching students the design of parts by parametric solid modeling. Topics covered include, but are not limited to, sketch profiles; geometric and dimensional constraints; 3-D features; model generation by extrusion, revolution and sweep; and the creation of 2-D drawing views that include sections, details and auxiliary

Course Description
Focuses on teaching students the design of parts by parametric solid modeling. The topics covered will include, but not limited to, sketch profiles; geometric and dimensional constraints; 3-D features; model generation by extrusion, revolution and sweep; and the creation of 2-D drawing views that include sections, details and auxiliary. The course utilizes Autodesk software, SOLIDWORKS software and certification materials.

Semester Credits: 3 Lecture Hours: 2 Lab Hours: 2

Required Materials

Textbook:
Solidworks 2024 and Engineering Graphics, An Integrated Approach by Randy H. Shih ISBN: 9781630576325

Autodesk Inventor Professional 2024 for Designers (also used in CAD 241) by Sham Tickoo ISBN: 9781640571792

Software:
Autodesk provides each student with access to a downloadable full version of the AutoCAD programs. The student can download the Autodesk programs onto their personal computer from the storage site provided.

SolidWorks software can be accessed online and downloaded as a trial version and separate download instructions will be posted in Modules on Canvas. This software must be installed and functional prior to first class.

Other Required Materials:
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Course Outcomes

At the completion of this course, successful students will

- Demonstrate advanced 3D techniques in design and manufacturing using Solidworks and Inventor platforms
- Demonstrate sketching geometry with constraints, tolerances, and dimensions in Solidworks, Inventor and OnShape
- Demonstrate the use of the Solidworks, Inventor and OnShape software, including the interface and environment.
- Compare and Contrast Solidworks, Inventor and OnShape software interfaces
- Create base features and placed features and use modification tools in both Solidworks and Inventor.
- Create solid models using adaptive and parametric 3D tools in both Solidworks and Inventor
- Understand “design intent” and “reverse engineering” to create models from existing parts using Solidworks and Inventor.
- Create 2D detailed production drawings with industry standard ASME dimensions from 3D parametric parts in Solidworks and Inventor
- Create assemblies using multiple parts and assembly constraints in Solidworks and Inventor
- Create exploded assemblies from presentation file.
- Prepare for CSWA Solidworks Examination

Topical Description

- Title Blocks and Drawing Sheets
- Solidworks 3D modeling interface introduction
- Leveraging parametrics in Solidworks
- Patterning, Holes and Fits
- Planes and Section Cuts
- Virtual Sharps, Center points, Balloons and Flag Notes
- CSWA Assemblies
- CSWA Test Prep
- Inventor Title Block, Shaft Designer

- Inventor Drawings with Flag Notes
- Inventor Stress Analysis
- Inventor Sheet Metal Modeling, Drawings and Symbology
- Inventor Surface Roughness, Tap and Die
- Inventor Drawing Section cuts
- Leveraging Parametrics in Inventor
- Inventor Gears and Patterning
- Introduction to Browser-based Onshape software
- Inventor Assemblies with BOM

Notes to Instructors

Beginning Fall 2020, VWCC will require students to have a computer or reliable access to a computer, capable of participation in an online format. Online courses at Virginia Western require a significant amount of interaction with Canvas, the Learning Management System, and many require real-time class sessions using the Zoom web-conferencing tool. To be successful in online classes, students must have substantial access to a computer with hi-speed internet connectivity. The expected requirements are listed on the college webpage.

This class is split into two sections; the first 8 weeks are focused on Solidworks and the last 8 weeks are focused on advanced Autodesk Inventor skills. Students will be allowed to sit for the CSWA Solidworks certification for free after the first 8 weeks of class. Students will be eligible to sit for the Autodesk Inventor certification at the finale of the class. Two certifications will be offered in this class.

The textbook for the Inventor portion of this class is purposefully chosen to complement the CAD 241 class and should continue to match the required text in CAD 241.

ADA Statement (PDF)
Title IX Statement (PDF)