Montgomery County Community College

BIPCT 2022
Introduction to SOLIDWORKS
0-22-22

Course Description:

This course covers creation of parts, assemblies, and drawings using SOLIDWORKS 3D Computer Aided Design (CAD) software. This is a hands-on course, with lessons and demonstrations immediately followed by lab time for independent work on exercises designed to refine fundamental skills and concepts. The course also includes cursory introductions to Simulation offerings within the SOLIDWORKS product suite (FEA, CFD), Additive Manufacturing (Rapid Prototyping, 3D Printing) and Objectives of the Certified SOLIDWORKS Professional (CSWP) exam.

Pre-Requisites:

Demonstrable proficiency with any software within the Microsoft Office suite (e.g., Word, Excel, PowerPoint) and rudimentary file management using Windows operating system.

Previous Course Requirements
None

Previous or Concurrent Course Requirements
None

Course Comment(s)

None

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Familiarity with the SOLIDWORKS user interface, including customized toolbars, keyboard shortcuts, and document templates.	Lecture/Discussion Hands on Lab Exercises	Discussion/Questions Demonstrations (at each student computer)
2. Ability to efficiently create fully-defined 2D sketches, purpose-built for specific 3D feature generation.	Lecture/Discussion Hands on Lab Exercises	Discussion/Questions Demonstrations (at each student computer)

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
3. Control of spatial orientation of sketches within parts, parts within assemblies, views within drawings	Lecture/Discussion Hands on Lab Exercises	Discussion/Questions Demonstrations (at each student computer)
4. . Understanding of the use of 3D solid models in preparation for simulation studies and for manufacturing.	Lecture/Discussion	Discussion/Questions Demonstrations (at each student computer)

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria*.

Sequence of Topics:

Introduction to Engineering Graphics and SOLIDWORKS

- Feature-Based Solid Modeling, Associative Documents
- SOLIDWORKS Basics and the User Interface

Sketching

- Reference Geometry, Origin, Planes, 3D Orientation
- Open vs Closed Contours, Sketch Entities
- Dimensions and Relations

Part Modeling

- Part Template Creation and Usage
- Part Level Features
  (e.g., Extrude, Revolve, Loft, Sweep, Fillet, Pattern, Shell, Draft)

Assembly Modeling

- Assembly Template Creation and Usage
- Mates
  (e.g., Coincident, Parallel, Concentric, Angle, Symmetric, Distance, Width)
- Inserting Components
- Bottom-Up vs Top-Down Approaches, Layout/Skeleton Parts

2D Drawings

- Drawing Templates and Sheet Formats (Title Blocks)
- View Creation
  (e.g., Isometric/Projected/Section/Crop/Detail/Broken Views)

- Orthographic Projection, Dimensioning Standards, Layers, Revision Control

3D Models as Preparation for Additional Activities

- 2D Mechanical Drawings for Machinists
- CNC Toolpath Generation
- Meshing for Finite Element Analysis and Computational Fluid Dynamics
- STL Faceted File Generation for Rapid Prototyping (Additive Manufacturing)

Learning Materials:

No required textbook. Reference material will be provided for lab exercises.
SOLIDWORKS Educational software
Engineering Labs: Rapid Prototyping System will be installed in the lab.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

Course Approval:

Prepared by: Brad Snow and Anil Datta Date: 10/08/18

Jim Fox, Executive Director, Workforce Development
Compliance Verification: Date: 10/11/18

Revised by: Date:
Jim Fox, Executive Director, Workforce Development
Compliance Verification: Date:

This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.