Fall 9-1-2018

DDSN 135.01: Solidworks

Steve Shen
University of Montana - Missoula, steve.shen@umontana.edu

Missoula College UM
Department of Applied Computing and Engineering Technology
Course Syllabus

DDSN 135 SolidWorks
Credit: 3
Prerequisite: None
Term: Autumn 2018

Meetings:
Tuesday & Thursday 10:30am to 11:50am in MC 025 Missoula College River Campus

Faculty Contact:
Steve Shen - steve.shen@umontana.edu
Phone: (406)243-7914
Office Hours: MW 1:00pm to 2:00pm, TR 12:00pm to 1:00pm

Office: Room 422 Missoula College – River Campus

Course Description

DDSN 135 SolidWorks (3 Credits). *Offered Spring and Autumn.*

This course introduces the fundamentals of Solidworks 3D parametric feature-based CAD software for the creation of parts, assemblies, drawings, rendering, and animation. The course approach is designed to bring the real power of SolidWorks as a powerful modeling and design system in addition to the individual tools and functionalities available in the software. Hands-on trainings are emphasized throughout the course to ensure that the students gain practical skills to efficiently use SolidWorks based on a sound understanding of the theoretical concepts of 3D modeling and design.

Course Overview

In recent years, with the advancement of computer and computing engineering, computer aided design (CAD), computer aided manufacturing (CAM), computer aided engineering (CAE), SolidWorks, and 3D and 4D printing have assumed an increasingly important role in the development and advancement of modern civilization and technology. Practically, every aspect of our day-to-day activities is affected by some type of CAD/CAM systems. CAD/CAM/CAE and 3D printing systems are found in abundance in all sectors of industry, such as manufacturing, drones, and many others.

SolidWorks (stylized as SOLIDWORKS) is a solid modeling computer-aided design (CAD) and computer-aided engineering (CAE) computer program that runs on Microsoft Windows. SolidWorks is published by Dassault Systèmes. According to the publisher, over two million engineers and designers at more than 165,000 companies were using SolidWorks as of 2013.

The course DDSN 135 SolidWorks introduces SolidWorks as a design system in addition to the application software. The course uses design, modeling, and drafting as the building blocks. As indicated in the textbook, the course is designed to bring the real power of SolidWorks as a powerful modeling and design system instead of only a software program. The theoretical concepts behind the various functions of SolidWorks are introduced in the course. The course provides plenty of illustrations, step-by-step instructions, and rich and challenging end-of-chapter problems.

This course introduces the terminology, concepts, processes, and the fundamental methods of design, modeling, and drafting of SolidWorks. The course is hands-on oriented for the students to gain practical skills in SolidWorks. Problem-based projects and problem-solving strategies are emphasized throughout the course. Students will have opportunities to work hands-on in teams to practice the basic functionalities and the three models of SolidWorks: part, assembly, and drawing, and to exercise project management.

Course Objectives

Upon completion of the course, the student should be able to:

1. Demonstrate an understanding of SolidWorks concepts.
2. Describe SolidWorks concepts.
3. Explain 3D CAD/CAM modeling concepts.
4. Understand the basic SolidWorks Design process.
5. Describe the building blocks of design, modeling, and drafting concepts.
6. Demonstrate an understanding of Engineering Design Process (EDP), CAD Process, Manufacturing Process, and Computer Aided Manufacturing (CAM) Process.
7. Describe the basic functionalities and the three models of SolidWorks: part, assembly, and drawing.
8. Describe modeling management and the types of CAD models: Extrusion, Revolve, Composite, and Free form.
9. Describe design intent in CAD design and design intent system.
10. Explain basic part modeling with the details of engineering drawing, assemblies, and rendering.
11. Describe the use of SolidWorks interface.
12. Demonstrate an understanding of top-down design (skeleton modeling).
13. Demonstrate a hands-on ability to create modeling of parts, assemblies and drawings.
14. Build an understanding of top-down design (skeleton modeling)
15. Demonstrate an ability to collaborate in groups and teams in problem solving and in project management

Required Materials

Mastering SolidWorks: the design approach. Second edition, by Ibrahim Zeid, Pearson, 2015.
ISBN-13: 978-0-13-388594-1
ISBN-10: 0-13-388594-1

Assessment

Grades will be weighted and graded as follows:

Attendance	5%
Homework Assignments	10%
Lab Exercises	45%
Unit Projects	15%
Final Project	25%

Grading Scale:

90-100%	A
80-89%	B
70-79%	C
60-69%	D

Topic Outline

1. Computer aided design (CAD) basics
2. Engineering design process (EDP)
3. CAD process
4. CAM process
5. Manufacturing process
6. Modeling plan
7. Part creation
8. Modeling management
9. Types of CAD models
10. Planning part creation
11. Part topology
12. Parametric modeling
13. Customizing SolidWorks
14. Productivity tools
15. Coordinate systems
16. Sketch planes and status
17. Equations and link values
18. Geometric modifiers
19. Grids
20. Patterns
21. Selecting, editing, and measuring entities
22. Templates
23. Viewing
24. Model communication
25. Design intent
26. Capturing and documenting design intent
27. Comments
28. Design binder
29. Equations
30. Design tables and configurations

31. Dimension and feature names
32. Folders
33. Basic part modeling
34. Features and macros
35. Drawings
36. Assemblies
37. Rendering and animation
38. Advanced part modeling

Academic Integrity:

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at: Student Conduct Code.

Using the Web to research materials and concepts is an integral part of learning in the twenty-first century. Studying with other students is a productive method of learning. A certain amount of collaborating on concepts with other students and using resources found on the Internet in an assignment is recommended. Copy and paste is not acceptable. It is expected that each student will input his/her assignment into the computer, and each student must be able to explain any assignment turned in. Collaboration on exams is strictly forbidden.

Dropping and Adding Courses or Changing Sections, Grading or Credit Status

University Policy for dropping courses or requesting grading/credit status changes can be found in the catalog: Add/Drop Policy.

Students should become familiar with all academic policies.

For Complete Academic Policies Please View the UM Catalog at: Academic Policies**.**

Disability Accommodations:

Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please contact me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disability Services website at http://www.umt.edu/dss . Or call 406.243.2243 (voice/text).

Changes to Syllabi:

NOTE: Instructor reserve the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances. If changes are made to the syllabus, amended copies will be dated and made available to the class.

Cell Phone and other Electronic Communication Devices Policy:

All electronic communication devices must be tuned off and stowed away prior to the start of class.

Attendance Policy:

Regular classroom attendance is expected.

Exam, Project, and Assignment Policy:

All exams are to be taken on the assigned date and time. Projects and assignments are due at the start of class on the assigned date and time. Late assignments will be accepted at the instructor's discretion. Rescheduling of an exam will be approved at the discretion of the instructor and only in extraordinary situations.

Learning Management System:

It is the responsibility of the student to access and familiarize herself/himself with the Learning Management System (LMS) for the course (Moodle). Access & training is available through UMOnline http://umonline.umt.edu

ASSIGNMENTS

DSNN 135 SolidWorks **Spring 2018**

Instructor: Steve Shen
(406)243-7914
steve.shen@umontana.edu

General Requirements for the Course

1. All the assigned lab experiments and projects are to be done individually unless otherwise indicated by the instructor. Team discussions are encouraged.
2. Please **demonstrate every lab experiment and project** to the instructor as soon as you complete them, then send them in for grading..
3. Late work may be accepted at most one week after the due date and can receive a maximum of **70%** of the full credit.
4. No work will be accepted **one week after the due date**, or after the solutions have been gone through.
5. No work will be accepted after the final week of the semester.
6. When turning in your work **electronically** (steve.shen@umontana.edu), please follow the **format** below to name the files:

   YourLastName_Chapter #_HW (for Homework)
   YourLastName_CH#_Example # (for the Examples in each chapter)
   YourLastName_CH#_Tutorial # (for the Tutorials in each chapter)
   YourLastName_CH#_Project # (for Projects)

   For example:

Dawson_CH01_Example 1-3	(for Examples)
Dawson_CH01_Tutorial 1-1	(for Tutorials)
Dawson_CH01_HW 1-1	(for Homework)
Dawson_CH01_P2-6	(for Projects)

Chapter 1 Gtting Started

Assignments:

1. Read the Chapter.

2. **Lab Exercises**: Do the ***Examples*** 1-1, 1-2, 1-3, 1-4, and 1-5 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically (steve.shen@umontana.edu) by Thursday 09/20/18.
3. **Lab Exercises**: Do the ***Tutorials*** 1-1, 1-2, 1-3, 1-4, and 1-5 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 09/20/18.
4. **Homework**: Do end of Chapter 1 ***Problems*** # 1 and 8, show your work to the instructor, and send them to the instructor electronically by Thursday 09/20/18.

Chapter 2 Modeling Management

Assignments:

1. Read the Chapter.
2. **Lab Exercises**: Do the ***Examples*** 2-1, 2-2, 2-3, 2-4, 2-5, and 2-6 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 10/04/18.
3. **Lab Exercises**: Do the ***Tutorials*** 2-1, 2-2, 2-3, 2-4, 2-5, and 2-6 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 10/04/18.
4. **Homework**: Do end of Chapter 2 ***Problems*** # 3, show your work to the instructor, and send them to the instructor electronically by Thursday 10/04/18.

Chapter 3 Design Intent

Assignments:

1. Read the Chapter.
2. **Lab Exercises**: Do the ***Tutorials*** 3-1, 3-2, 3-3, and 3-4 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 10/11/18.
3. **Homework**: Do end of Chapter 3 ***Problems*** # 1, 2, and 3, and send them to the instructor electronically by Thursday 10/11/18.
4. **Unit Project 1**: Do Problem #6 of Chapter 2, save the files, show your work to the instructor, and send it to the instructor electronically by Thursday 10/11/18.

Starting **Final Project**

The Final Project is a course-level comprehensive design project using SolidWorks.
The Final Project is due **Thursday 12/13/2018**.

Listed below are the guidelines and requirements for the final project:

1. The project has to be an original and individual work, while team discussions are highly encouraged.

2. The project will have at least four parts to create an assembly.
3. The project will include three components:

- Parts
- Drawings
- Assemblies

4. The project needs to be properly documented and include:
    - Title of the project
    - Project description including the purpose, background, objectives, design procedure, etc.

The project is to be evaluated according the following criteria:

- Completion of the project
- Creativity
- Practical applications
- Complexity
- Degree of difficulty
- Reusability

Chapter 4 Features and Macros

Assignments:

1. Read the Chapter.
2. **Lab Exercises**: Do the ***Examples*** 4-1, 4-2, 4-3, and 4-4 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 10/25/18.
3. **Lab Exercises**: Do the ***Tutorials*** 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, and 4-8 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 10/25/18.
4. **Homework**: Do end of Chapter 4 ***Problems*** # 1, 2, 3, 4, 5, and 6, and send them to the instructor electronically by Thursday 10/25/18.

Chapter 5 Drawings

Assignments:

1. Read the Chapter.
2. **Lab Exercises**: Do the ***Examples*** 5-1 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 11/01/18.
3. **Lab Exercises**: Do the ***Tutorials*** 5-1, 5-2, 5-3, 5-4, and 5-5 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 11/01/18.
4. **Homework**: Do end of Chapter 5 ***Problems*** # 1, 2, 3, and 4, and send them to the instructor electronically by Thursday 11/01/18.

Chapter 6 Assemblies

Assignments:

1. Read the Chapter.
2. **Lab Exercises**: Do the ***Examples*** 6-1 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 11/15/2018.

3. **Lab Exercises**: Do the ***Tutorials*** 6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-7, 6-8, 6-9, and 6-10 in the Chapter, save the files, show your work to the instructor, and send them to the instructor electronically by Thursday 11/15/2018.
4. **Homework**: Do end of Chapter 6 ***Problems*** # 1, 2, 3, 4, and 5, and send them to the instructor electronically by Thursday 11/15/2018.
5. **Unit Project 2**: Do Problem #11 of Chapter 6, save the files, show your work to the instructor, and send it to the instructor electronically by Thursday 11/15/2018.

Chapter 7 Rendering and Animation

Assignments:

1. Read the Chapter.
2. **Lab Exercises**: Do the ***Examples*** 7-1 and 7-2 in the Chapter, save the files, and show/send them to the instructor by Thursday 11/29/2018.
3. **Lab Exercises**: Do the ***Tutorials*** 7-1, 7-2, 7-3, 7-4, 7-5, 7-6, and 7-7 in the Chapter, save the files, and show/send them to the instructor electronically by Thursday 11/29/2018.
4. **Homework**: Do end of Chapter 7 ***Problems*** # 1, 2, and 3, and send them to the instructor electronically by Thursday 11/29/2018.

Chapter 8 Curves

Assignments:

1. Read the Chapter.
2. **Lab Exercises**: Do the ***Examples*** 8-1, 8-2, and 8-3 in the Chapter, save the files, and send them to the instructor electronically by Thursday 12/06/2018.
3. **Lab Exercises**: Do the ***Tutorials*** 8-1, 8-2, 8-3, 8-4, 8-5, 8-6, 8-7, 8-8, and 8-9 in the Chapter, save the files, and send them to the instructor electronically by Thursday 12/06/2018.
4. **Homework**: Do end of Chapter 8 ***Problems*** # 1, 2, 3, and 4, and send them to the instructor electronically by Thursday 12/06/2018.

Chapter 9 Surfaces

Assignments:

1. Read the Chapter.
2. **Lab Exercises**: Do the ***Examples*** 9-1, 9-2, 9-3, and 9-4 in the Chapter, save the files, and send them to the instructor electronically by Thursday 12/13/2018.
3. **Lab Exercises**: Do the ***Tutorials*** 9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7, 9-8, 9-9, and 9-10 in the Chapter, save the files, and send them to the instructor electronically by Thursday 12/13/2018.
4. **Homework**: Do end of Chapter 9 ***Problems*** # 1, 2, and 3, and send them to the instructor electronically by Thursday 12/13/2018.

Final Project: Due **Thursday 12/13/2018**.