U901104: Computer-Aided Design (CAD)

Course Format: Online

Course Author: Jagadeep Thota, Ph.D.

Course credits: 3

Prerequisites: None

Course Description: This course equips students with the computer aided design software tools to generate 2D graphics and 3D models that meet industry standards. Introduces students to computer aided drafting using the AutoCAD software. Students also learn solid modeling concepts such as part modeling, assemblies and sheet metal modeling using SolidWorks software. At the end of this course, students will be able to visualize, communicate, and document objects/parts in industry standard 2D engineering drawings and successfully create 3D assemblies.

Required Course Materials
- Engineering Graphics Essentials with AutoCAD 2022 Instruction, Kirstie Plantenberg, SDC Publications. ISBN: 978-1-63057-434-5. (Course modules 1 to 7 use this textbook).
- Parametric Modeling with SOLIDWORKS 2021, Randy H. Shih and Paul J. Schilling, SDC Publications. ISBN: 978-1-63057-404-8. (Course modules 9 to 15 use this textbook).

Optional Course Material (*not required to have for students, but the author of this course is acknowledging that some lecture content for this course was obtained from the below book*)
- Technical Drawing with Engineering Graphics, Frederick Giesecke, 14th edition, Peachpit Press Publication. ISBN: 978-0-13509-049-7.

Hardware Requirements
A computer with a webcam, speakers, and a microphone recommended (mainly for discussions with the course author regarding any questions on the course content). Having Microsoft Windows operating system, and minimum 6 GB RAM and 500 GB hard disk space.

Software Requirements (access to the software will be available through virtual lab)
- AutoCAD 2021
- SolidWorks 2019

Course Learning Objectives
- Learn common industry drafting practices.
- Learn to create 2D engineering drawings of parts.
- Learn to create basic 3D modeling parts.
- Learn to create sheet metal parts.
- Build assemblies.
- Conduct computer-aided design of real-world design problems.
- Learn two commonly used engineering software in the industry; AutoCAD and SolidWorks.

Course Overview

MODULE #	MODULE TOPIC	EVALUATED ACTIVITIES
1	Drafting & AutoCAD Introduction	Independent Practice 1
2	Drawing Commands	Independent Practice 2
3	Orthographic Projections	Independent Practice 3
4	Dimensioning	Independent Practice 4
5	Sectioning & Tolerancing	Independent Practice 5
6	Isometric & Assembly	*None*
7	Mid Course Exam	**Mid-Term Exam**
8	3D Modeling & SolidWorks Introduction	Independent Practice 6
9	Sketching & Basic 3D Modeling	Independent Practice 7
10	Intermediate 3D Modeling	Independent Practice 8
11	Modeling Relations & Symmetry	Independent Practice 9
12	Engineering Drawing	Independent Practice 10
13	Advanced 3D Modeling	Independent Practice 11
14	Assembly	*None*
15	Final Exam	**Final Exam**

Evaluation Methods
Your final grade will be based on your performance on the following:
1) Independent Practices = 60%
2) Mid-Course Exam (using AutoCAD) = 20%
3) Final Exam (using SolidWorks) = 20%

Independent Practices (60%)
Each module will have an independent practice assignment that will allow you to demonstrate your ability to perform the objectives from the module.

Mid-Course Exam (20%)
This exam will cover the first part of the course. You will be demonstrating your ability to use the AutoCAD program.

Final Exam (20%)
This exam will cover the second part of the course. You will be demonstrating your ability to use the SolidWorks program.

Exam Method: Online Without Proctoring
This course requires all students to complete two exams online, one mid-term exam and one final exam. Both these exams will not involve any proctoring but it will have to be the student's individual work. Students receive one attempt on each exam. The mid-term exam will need AutoCAD software to do the exam, while the final exam will need SolidWorks software.

Grading Scale
The following grading scale is used to evaluate all course requirements and determine your final grade:

A = 93–100	B = 83–87.9	C = 70–77.9	D = 60–69.9

AB = 88–92.9	BC = 78–82.9		F = Below 60

Pass/Fail Option
Students who enroll in an Independent Learning (IL) course under the pass/fail option will receive a final grade of S in place of a final grade equivalent to an A, AB, B, BC, or C and a final grade of U in place of a final grade equivalent to a D or F.