

Computer Aided Design and Modeling – ENGR 131, Section 01

Abilene Christian University

Credit Hours: 3

Semester and Year: Fall 2014

Pre-requisites/co-requisite: None

Class Meeting Times and Location

This class meets Monday and Wednesdays in Brown Library 231 from 7:30 am to 8:50 am.
The final exam is scheduled for 8:00 to 9:45 am on Friday, December 12, 2014.

Required Text and Software

The required text for this course is *Learning Autodesk Inventor 2015: A Tutorial Introduction*, by L. Scott Hansen, SDC Publications, 2014, ISBN 978-1-58503-877-0. The required software for this is: Autodesk Inventor Professional 2015. A free student copy of this software can be downloaded at <http://www.autodesk.com/education/free-software/all>.

Catalog Description

An introductory course in the use of computer aided design (CAD) software for drafting, engineering design, and 3D modeling. (3 Hours)

Intended Audience

This is a required course for Engineering majors and intended to be completed during their Freshman or Sophomore year. Non-majors interested in developing technical skills in the computer aided design may also enroll in the course. Basic computer skills and college level geometry competency are required for all students.

Contact Information

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Office Hours: M (10:00 -11:00 am) T (1:30-2:30 pm) W (10:00 – 11:00 am and 1:30 – 3:30) and Friday (1:30 – 3:30 pm). Additional office hours can be arranged as needed.

TEACHING PHILOSOPHY

Engineering is a well-respected profession. The public entrusts engineers to be honest, competent, and ethical. Many codes of ethics for these fields indicate that the commitment to protecting the health, safety, and welfare of the public is of paramount importance. These values are in harmony with Christian principles and ideals. Christian engineers should be honest (Matthew 5:37), work hard to ensure competency (Colossians 3:23), and put the public's interest ahead of his or her own (Luke 6:31). In light of these principles, this course will be taught such that you will gain an appreciation for the professional nature of engineering. It will be taught so as to give you every opportunity to begin to develop

competency in these fields. This will require homework, quizzes, test, and group discussion. The instructor especially encourages the discussion of topics that would bear on integrating faith and professional responsibilities (cheating on licensure exams, weapons design and manufacture, environmental laws and employment opportunities in developing nations, etc.)

Learning Objectives

The activities of the course support the assessment of the following ABET Outcomes:

Criterion 3

3(g1) an ability to communicate effectively (3g1 oral communication)

3(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

ABET Learning Objectives	Course Competencies	Measurement
3(g1) an ability to communicate effectively (Oral Communications)	Present technical information in an oral presentation.	Project 3 – oral presentation (ABET Rubric)
3(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	Develop drafting skills utilizing CAD software.	Homework, Projects, Quizzes (Project 3 – ABET Rubric)
	Create digital 3-D models of objects.	Projects, Test (Project 3 – ABET Rubric)
	Use software to render CAD files in multiple formats.	Homework, Projects (Project 3 – ABET Rubric)
	Generate orthographic and section view drawings of objects.	Homework, Quizzes, Projects, Test (Project 3 – ABET Rubric)

ACADEMIC INTEGRITY POLICY

Academic integrity is defined as academic work completed as assigned for each class by the individual or group responsible for the work. Violations of academic integrity and other forms of cheating involve the intention to deceive, mislead, or misrepresent and therefore, are a form of lying. Such actions are contrary to behavioral norms that flow from the nature of God. Academic misconduct includes, but is not limited to, the following: 1) Failure to give credit to sources used in a work in an attempt to present the work as one's own, 2) Submission of papers or projects obtained from another source (e.g., research service or club paper file) as one's own, and 3) Falsifying information orally or in writing. Academic misconduct may result in, but is not limited to, a zero on the assignment and/or an F in the course. Additionally, the department chair, Dean of the College of Arts and Sciences, and the Dean of Student Life will be notified. See the full university policy, including how to appeal a decision, by following this link: <http://www.acu.edu/campusoffices/studentlife/judicialDocuments/AcademicIntegrityPolicy.pdf>.

ATTENDANCE

Attendance is expected at all class sessions. It is also expected that you arrive promptly. If you are absent or tardy it will negatively affect your participation, homework, and quiz grades.

GRADING POLICY

Homework – (10 assignments)

One set of homework will be assigned on Monday each week and will be due at the beginning of class the following Wednesday. Late Homework will not be graded.

Quizzes – (14 quizzes)

Quizzes will be given at the beginning of every Monday Class. Thus it is important that you be in class and on time to complete the quiz in the allotted time period.

Attendance

Part of your final grade in this course will depend upon your attendance and you acting respectful and participating during class. You can't participate effectively if you do not come prepared. Based upon percentage of class periods attended.

Projects – (3 Projects)

A portion of your final grade will be based upon projects utilizing computer based design software both in groups and individually. Examples of projects include but are not limited to 3-D CAD modelling of schematics or objects, 3-D printing of CAD models, CNC and Laser cutout of 3-D model components, and the animation and presentation of 3-D models. The final project will include an oral presentation of the project in addition to technical deliverables. During group projects, I reserve the right to give any individual a lower grade than the rest of the group for not making adequate contributions to the project. The final project (Project 3) will be selected by individual students and Projects 1 and 2 will be selected by the instructor.

Final Exam – (Skills based and written portion)

The final exam is will be comprehensive.

Calculation of Final Course Grade-

Homework.....	20 %
Quizzes.....	30 %
Participation/Attendance.....	10 %
Project(s).....	30 %
Final Exam.....	10 %

90% and above	A
80% - 89%	B
70% - 79%	C
60% - 69%	D
59% and below	F

ADA COMPLIANCE STATEMENT

“Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The Alpha Scholars Program facilitates disability accommodations in cooperation with instructors. In order to receive accommodations, you must be registered with Alpha Scholars Program, and you must complete a specific request for each class in which you need accommodations. If you have a documented disability and wish to discuss academic accommodations, please call our office directly at 325-674-2667.”

THE MISSION OF ACU:

To educate students for Christian service and leadership throughout the world.

THE MISSION OF THE COLLEGE OF ARTS AND SCIENCES:

To educate students for worldwide Christian service and leadership through programs of study and other learning experiences that blend a liberal arts education with professional and career education

THE MISSION OF THE ENGINEERING AND PHYSICS DEPARTMENT:

The ACU engineering program strongly supports the university's mission of educating students for Christian service and leadership throughout the world. In support of this mission, ACU engineering graduates will attain:

a deep and broad understanding of engineering principles and practices as evidenced by professional employment, continued professional development, and graduate study in engineering or other professional fields.

an extensive knowledge of the innovative design processes unique to engineering professionals as demonstrated by using critical thinking skills to contribute to the scientific and technical literature, patents and intellectual property, professional societies, and creative designs.

a thorough understanding of Christian service and leadership as shown in their commitments to professionalism, ethics, and service and leadership within the engineering profession, the church, and society.

COURSE SCHEDULE

Week	Date	Topics and Text	Assignments	Assignment Due Date
1	Monday, August 25, 2014	Introduction - Syllabus	Chapter 1 Tutorial Part	9/3/2014
	Wednesday, August 27, 2014	Chapter 1 Sketch Panel, general dimensions, part features panel, and extrusions	Chapter 1 Exercises 2, 4, 5, 7, and 10	
	Friday, August 29, 2014	Chapter 1 Fillet command, hole command, file management		
2	Monday, September 01, 2014	Quiz - Chapter 2 Revolve command, cutting grooves	Chapter 2 Tutorial	9/10/2014
	Wednesday, September 03, 2014	Chapter 2 Creating circular pattern	Chapter 2 Exercises 4, 8, 11, and 12	
	Friday, September 05, 2014	Chapter 3 Orthographic view	Chapter 3 Tutorial	
3	Monday, September 08, 2014	Quiz Chapter 3 3D Solid models	Chapter 3 Exercises 1, 4, 6,	9/17/2014
	Wednesday, September 10, 2014	Chapter 4 Auxiliary and section views, drawing annotations	Chapter 4 Tutorial	
	Friday, September 12, 2014	Project 1 Introduction - Hand Drawings – Top, side, and front view		
4	Monday, September 15, 2014	Quiz - Hand Drawings – Orthographic views	Hand Drawing Assignments	9/24/2014
	Wednesday, September 17, 2014	Project 1 Work Day		
	Friday, September 19, 2014	Hand Drawings – Orthographic views		
5	Monday, September 22, 2014	Quiz - Chapter 4 Cross Sectioning	Chapter 4 Exercises 3, 4, 5, and 7	10/1/2014
	Wednesday, September 24, 2014	Chapter 4 Parts lists and title block		
	Friday, September 26, 2014	Project 1 Submission Project 2 Introduction	Project 1 Submission	
6	Monday, September 29, 2014	Quiz - Chapter 5 Drawing and part editing	Chapter 5 Tutorial	10/8/2014
	Wednesday, October 01, 2014	Chapter 6 X,Y, and Z planes, wireframe construction	Chapter 5 Exercises 1, 2, 7, and 8	
	Friday, October 03, 2014	Chapter 6 Wireframe construction and project geometry	Chapter 6 Tutorial Parts	

7	Monday, October 06, 2014	Quiz - Chapter 7 Project assembly modeling and animation	Chapter 7 Tutorial Parts	10/15/2014
	Wednesday, October 08, 2014	Project 2 Work Day	Chapter 7 Exercises (Assembled and Animated V-Twin)	
	Friday, October 10, 2014	Chapter 7 and 8 Simulations, presentation importing, and explosions	Chapter 8 Tutorial	
8	Monday, October 13, 2014	Quiz - Project 2 Work Day	Chapter 8 Exercises 1, 2, 3, and 4	10/22/2014
	Wednesday, October 15, 2014	Chapter 8 Part trails, detailed assembly		
	Friday, October 17, 2014	Project 2 Submission Project 3 Introduction		
9	Monday, October 20, 2014	Quiz - Chapter 9 Sweeps and rectangular patterns		10/29/2014
	Wednesday, October 22, 2014	Project 2 (Maker Lab)		
	Friday, October 24, 2014	Project 2 (Maker Lab)	Chapter 9 Tutorial	
10	Monday, October 27, 2014	Quiz - Chapter 9 Lofts and coils	Chapter 9 Exercises 1 and 2	11/5/2014
	Wednesday, October 29, 2014	Chapter 10 Polygons and threads	Chapter 10 Tutorials	
	Friday, October 31, 2014	Chapter 11 Advanced work planes	Chapter 11 Tutorial	
11	Monday, November 03, 2014	Quiz - Project 3		11/12/2014
	Wednesday, November 05, 2014	Chapter 12 Introduction to stress analysis	Chapter 12 Tutorial	
	Friday, November 07, 2014	Chapter 13 Introduction to Design accelerator	Chapter 13 Tutorial	
12	Monday, November 10, 2014	Quiz - Project 3		
	Wednesday, November 12, 2014	Project 3		
	Friday, November 14, 2014	Project 3		
13	Monday, November 17, 2014	Quiz - Project 3		
	Wednesday, November 19, 2014	Project 3		
	Friday, November 21, 2014	Project 3		
14	Monday, November 24, 2014	Quiz - Project 3		
	Wednesday, November 26, 2014	No Class Thanksgiving		
	Friday, November 28, 2014	No Class Thanksgiving		

15	Monday, December 01, 2014	Project 3		
	Wednesday, December 03, 2014	Project 3	Project 3 Submission Project 3 Oral Presentation	
	Friday, December 05, 2014	Project 3	Project 3 Oral Presentation	
16	Monday, December 08, 2014	Dead Day No Class		
	Thursday, December 11, 2014	Final 2:00-3:45 pm		

Instructor reserves the right to modify the course schedule as necessary