LAMAR UNIVERSITY
MEMBER THE TEXAS STATE UNIVERSITY SYSTEM™

Syllabus

Lamar University, a Member of The Texas State University System, is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award Associate, Baccalaureate, Masters, and Doctorate degrees (more details at *http://www.lamar.edu*).

Department Industrial Engineering

Course Number	MEEN 3350
Course Title	Computer Aided Engineering
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Personal Introduction

Welcome to Lamar University. My name is Jenny Zhou, and I will be your instructor of record for MEEN 3350. By way of a very brief introduction, I earned my baccalaureate, master and Ph.D. degrees in Mechanical Engineering. I joined the faculty at Lamar in 2004 and I am currently a Professor for the Department of Mechanical Engineering in the College of Engineering.

Course Description

An overview of simulation-based design, including 3-D parametric solids models and finite element analysis, and its applications in mechanical engineering. Course focuses on the modeling aspects of mechanical systems simulation in static stress and deflection analysis.

Course Objectives and Student Learning Outcomes

Students who successfully complete this course will be able:
1. Apply the basic geometry design theory and use the fundamental 3D modeling techniques in Computer-aided Design software to design models.

2. Use finite element simulation tool to conduct engineering analysis on a CAD model.

3. Describe the basic concepts in computer aided engineering.

Academic Prerequisites

MEEN 2302, CVEN 2372.

Technology Prerequisites

The minimum technical skills and the system requirements for this course:

System Requirements

Computer/Technology Requirements

1. Students will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
    - Any current Flash-compliant browser (recent versions of Firefox or Safari)
        - Please note that Blackboard may not support Internet Explorer or Chrome.
    - 4GB of RAM, 8 GB or more preferred
    - Broadband connection (cable modem, DSL, or other high speed) required – courses are heavily video intensive
    - Video display capable of high-color 16-bit display – 1024 x 768 or higher resolution
    - A sound card and speakers or headphones
    - Current anti-virus software must be installed and kept up to date.
    - Students will need some additional free software for enhanced web browsing. Be certain to download the free versions of the software.
        - Adobe Reader (http://www.mozilla.org)
        - Adobe Flash Player (http://get.adobe.com/flashplayer)
        - Java (http://www.java.com)
    - Most home computers purchased within the last 3-4 years meet or surpass these requirements.
2. At a minimum, students must have Microsoft Office 2007 or newer, or OpenOffice, or Student Office for Mac. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission will also be required. If you do not have Microsoft Office or Student Office for Mac, you can check with the bookstore to see if they have any student copies.
3. **Your computer must be compatible with Blackboard.** Please see the Blackboard Supported Browsers and Operating System page to make sure your system will allow you to use all the tools and features available.

Technology Skills Requirements

You need to be able to:

- Navigate websites, including downloading and reading files from them.
- Download and install software or plug-ins such as Adobe Reader, Window Media Player or Flash.
- Use e-mail, including attaching and downloading documents/files from e-mail.
- Save files in commonly used word processing formats (.doc, .docx, .rtf).
- Copy and paste text and other items in computer documents.
- Save and retrieve documents and files on your computer.
- Locate information on the Internet using search engines.

- Locate information in the library using the online catalog.

Course Project Presentation
You will be asked to make a video to record your presentation for the course project. The video needs to be uploaded to Youtube. You will share the link to your Youtube video through the Blackboard Discussion Board for peer comments and discussions. The discussion board will be graded as part of the project score.

Course Materials

Required Text: Parametric Modeling with Autodesk Fusion 360, by Randy Shih, ISBN 9781630570552; hereby referred to as 'Shih Textbook'.

For the second half of the semester, I will prepare handout and lecture notes.

Students with Disabilities

For students with disabilities, this course will comply with all accommodations prescribed by the Lamar University the Disability Resource Center (DRC). **It is the responsibility of the student to insure that the instructor has been informed of all prescribed accommodations.** Lamar University's Disability Resource Center offers a variety of services designed to provide for students with disabilities and can be contacted at (409) 880-8347 or emailed at DRC@lamar.edu

The Office of Disability Resource Center offers a variety of services designed to assure students with disabilities equal access to the university's activities, programs and services. Some of the services provided include academic accommodations, assistive equipment, communication access service providers, note-takers, physical access and priority registration. Documentation of a disability from a professional in the field is required to receive services.

Students with disabilities should notify the director of DRC prior to registration in any university program. The director will arrange a meeting with the student to determine reasonable academic adjustments/accommodations. The Office of Disability Resource Center is located in 105 Communication Building. Students may write to P.O. Box 10087, Beaumont, Texas 77710, call 409.880.8347, fax 409.880.2225 or e-mail DRC@lamar.edu. Additional information is available at the DRC web site, http://www.lamar.edu/disability-resource-center/.

Response Times

The response time to emails is usually within 48 hours. The response time to discussion is usually within 7 days. The feedback on assignments and exams is within 2 weeks.

Software Used in This Class

Autodesk Fusion 360. Students can get a free full version from Autodesk Fusion 360 website.

Services Used in This Class

Here are some commonly used services and their privacy policies:

Blackboard - http://www.blackboard.com/Footer/Privacy-Center.aspx

Adobe Connect - http://www.adobe.com/privacy.html
Proctor U - http://www.proctoru.com/privacy.html
Youtube - https://www.youtube.com/static?template=privacy_guidelines

Student Services

Information on Student services can be located at http://students.lamar.edu/student-services/index.html

Academic Integrity Statement

Lamar University expects all students to engage in academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Disciplinary proceedings may be initiated against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion, and the abuse of resource materials.

> *Plagiarism* shall mean the appropriation of another's work or idea and the unacknowledged incorporation of that work or idea into one's own work offered for credit.
> *Collusion* shall mean the unauthorized collaboration with another person in preparing work offered for credit.
> *Abuse of resource* materials shall mean the mutilation, destruction, concealment, theft or alteration of materials provided to assist students in the mastery of course materials.
> *Academic work* shall mean the preparation of an essay, report, problem, assignment, creative work or other project that the student submits as a course requirement or for a grade.

Students are specifically warned against all forms of plagiarism, which include "purchasing, or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm." Plagiarism is defined as, "the appropriation and the unacknowledged incorporation of another's work or ideas into one's own offered for credit" (82). Students seeking to avoid plagiarism should consult either the course instructor or the most recent addition of the *MLA Handbook for Writers of Research Papers*. The course instructor will complete a thorough and impartial investigation of any instance of academic dishonesty. A student found guilty of academic dishonesty will be notified in writing by the instructor of the violation, the penalty, and the student's right to appeal the determination of dishonesty and/or the sanction imposed. Penalties for academic dishonesty in this course will result in either a lowered letter grade or failure of the course as determined by the instructor.

Copyright Policy Statement

Copyright is defined as the ownership and control of the intellectual property in original works of authorship which are subject to copyright law. As an institution of higher learning that values intellectual integrity, Lamar University prohibits the distribution of published materials (print or electronic) in violation of copyright law.

Netiquette (Online Etiquette) Statement

Please adhere to the same standards of behavior and professional respect online that you would follow in face-to-face communication with others, but most particularly when writing email and when taking part in collaborative and discussion board activities. Lamar provides access to network resources, including the Internet, in order to support learning and to prepare students for the 21st century world. Students, however, are expected to adhere to the *Lamar University Acceptable Use Policies when Using Networks.* More comprehensive student code of conduct can be found at http://students.lamar.edu/student-handbook.html#generalprovisions.

- **Acceptable Use**
  Students must respect the integrity and security of LU's computer systems and network, and the privacy and preferences of other users. Responsibility for learning about and complying with LU's Acceptable Use Policy ultimately rests with the individual. The network may be used to download, copy, or store any software, shareware, digital media files or freeware, as long as the use complies with copyright law; licensing agreements, and campus policies such as storage space limitations and network bandwidth restrictions. The network may not be used for any activity, or to transmit any material, that violates United States or local laws.
- **Unacceptable use**
  The network may not be used for commercial purposes. Advertising and sponsorships on LU web sites is restricted. In addition, students may not permit other persons to use their usernames, passwords, accounts or disk space, or disclose their usernames, passwords or account information to any third party. Students may not log on to someone else's account, internet address, or other network codes, or attempt to access another user's files. Students may not create false or dummy accounts to impersonate someone else. Students may not try to gain unauthorized access ("hacking") to the files or computer systems of any other person or organization. Students may not impersonate another person by forging e-mail, web pages or other electronic media. Students who maliciously access, alter, delete, damage or destroy any computer system, computer network, computer program, or data will be subject to disciplinary action by LU, and criminal prosecution as well. Students may not disrupt or attempt to disrupt network traffic, and they may not attempt to monitor or capture network traffic in any way. Finally, students may not intentionally create, store, display, print or transmit information that violates the university's Sexual Harassment Policy.

General Guidelines to Respect All Participants

- Respect the right of each person to disagree with others.
- Treat people the same as you would face-to-face.
- Respect the time of others

Guidelines When Communicating with Others (email, discussion, blogging, and etc.)

- Always sign your names to any contribution you choose to make.
- Be constructive in your responses to others in the class.
- Do not use all caps. (Doing so may be interpreted as shouting)
- Re-read your postings before sending them.
- Always think before you write.
- Respond respectively.
- Use appropriate grammar and structure.

- Spell-check your postings.
- Use short paragraphs focused on one idea
- Use appropriate business language at all times

Distance Education Librarian

Distance education students and faculty have access to a dedicated distance education librarian. Contact information and a full account of services can be found at http://vmlibweb.lamar.edu/distanceed/distedservice.htm

Lamar University Privacy Policy Statement

Student records maintained by Lamar University comply with the Family Education Rights and Privacy Act of 1974 as amended (PL93-380). Detailed information should be accessed through this link: **https://sacs.lamar.edu/catalog/PrefMaterial/V.GenAcademicPol.htm#edurights**.

Grading Policy and Evaluation

	MEEN 3350
Midterm Exam (CAD)	25%
Final Exam (FEA)	25%
Homework	20%
Project	25%
Merit (Attendance, discussion, etc.)	5%
Total	**100%**

A student earned 90% of the points will receive a grade of A. 80%, B. 70%, C. 60%, D. Otherwise, F.

Homework Collection and Make-up Work

Homework must be submitted on the due day. No late homework will be accepted. Please pay attention to Blackboard for the update. **You are expected to attend labs on time**, unless you have Doctor's approval. You must be in the lab unless you finish all the assignments. Each unauthorized attendance (lab or lecture) costs 0.5% in Merit.

Missed or late course work can only be made up if pre-approval is obtained. Otherwise, a grade of zero is assigned for the missed work.

Course Project

You will form a group of 1~3 persons and work on a course project. Details will be provided in a separate document.

Drop Dates

This course adheres to the add/drop standards for each term as stated by Lamar University. For more details, refer to the Lamar Academic Calendar. If the link does not work, visit Lamar University at http://www.lamar.edu, and search the site with the term, "Academic Calendar."

Course Evaluation

Instruction as well as student performance is subject to evaluation. Procedures for evaluation will be provided near the end of this course.

LU Connect Portal

Students are asked to obtain a Lamar Electronic Account username and password so they can log onto the LU Connect Web site. Students may get information on how to get into the LU Connect Web site from the University's homepage (*http://www.lamar.edu*) by clicking on the LU Connect link on the left top corner of the screen. Follow the steps to secure your LU Connect username and password. Access to library resources is described on the Academic Partnership page, also available through the *http://www.lamar.edu*.

Emergency Procedures

Many types of emergencies can occur on campus; instructions for specific emergencies such as severe weather, active shooter, or fire can be found at HTTP://WWW.LAMAR.EDU/ABOUT-LU/ADMINISTRATION/RISK-MANAGEMENT/INDEX.HTML

Severe Weather:

- Follow the directions of the instructor or emergency personnel
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building
- Stay in the center of the room, away from exterior walls, windows, and doors

Violence / Active Shooter (CADD):

- **CALL-** 9-1-1
- **AVOID-** If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY-** Barricade the door with desk, chairs, bookcases or any items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it's safe.
- **DEFEND- Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.**

Academic Continuity Statement

In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage (www.Lamar.edu) for instructions about continuing courses remotely.

ABET Outcomes Achieved: 1 (P), 5 (P), 11 (P) P = Primary

OUTCOME 1: An ability to apply knowledge of mathematics, science, and engineering to the analysis of industrial engineering problems, Criterion 3(a)

OUTCOME 5: An ability to identify, formulate, and solve engineering problems, Criterion 3(e)

OUTCOME 11: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, Criterion 3(k)

ABET category content as estimate by the faculty member who prepared this course description: Professional Component: 3 Credits of Engineering Topics

Course Content Outline

Course Content and Assignments	
Week 1	**Welcome and Course Introduction** **Fusion 360 CAD Chapter 1** **Online Homework and Textbook** Students are encouraged to introduce themselves via a discussion board during the first week of the course. **Readings** • Welcome and Introduction • Course Syllabus • Introduction and Chapter 1 in the Shih Textbook • Lecture Notes **Videos** • Welcome and Introduction to CIMS • Fusion 360 Chapter 1 – PowerPoint Slides • Fusion 360 Demo 1: Demo User Interface **Assessment** • Fusion 360 L1 Quiz • Fusion 360 L1 Models • Discussion: Self Introduction
Week 2	**Readings** • Chapter 2 in the Shih Textbook • Chapter 3 in the Shih Textbook • Lecture Notes **Videos** • Fusion 360 Chapter 2 – PowerPoint Slides • Fusion 360 Demo 2: Parametric Modeling Fundamentals • Fusion 360 Chapter 3 – PowerPoint Slides • Fusion 360 Demo 3: Constructive Sold Geometry Concepts **Assessment** • Fusion 360 L2 Quiz • Fusion 360 L2 Models • Fusion 360 L3 Quiz

	• Fusion 360 L3 Models
Week 3	**Readings** • Chapter 4 in the Shih Textbook • Chapter 5 in the Shih Textbook • Lecture Notes **Videos** • Fusion 360 Chapter 4 – PowerPoint Slides • Fusion 360 Demo 4: Model History Tree • Fusion 360 Chapter 5 – PowerPoint Slides • Fusion 360 Demo 5 - 1: Parametric Constraints Fundamentals • Fusion 360 Demo 5 - 2: A Design Change **Assessment** • Fusion 360 L4 Quiz • Fusion 360 L4 Models • Fusion 360 L5 Quiz • Fusion 360 L5 Models
Week 4	**Readings** • Chapter 6 in the Shih Textbook • Chapter 7 in the Shih Textbook • Lecture Notes **Videos** • Fusion 360 Chapter 6 – PowerPoint Slides • Fusion 360 Demo 6: Geometric Construction Tools • Fusion 360 Chapter 7 – PowerPoint Slides • Fusion 360 Demo 7 -1 : Parent/Child Relationships • Fusion 360 Demo 7 - 2: the BORN Technique **Assessment** • Fusion 360 L6 Quiz • Fusion 360 L6 Models • Fusion 360 L7 Quiz • Fusion 360 L7 Models
Week 5	**Readings** • Chapter 8 in the Shih Textbook • Chapter 9 in the Shih Textbook

	• Lecture Notes **Videos** • Fusion 360 Chapter 8 – PowerPoint Slides • Fusion 360 Demo 8: Part Drawings and 3D Annotations • Fusion 360 Chapter 9 – PowerPoint Slides • Fusion 360 Demo 9 - 1: Datum Features and Auxiliary Views • Fusion 360 Demo 9 - 2 : Drawing **Assessment** • Fusion 360 L8 Quiz • Fusion 360 L8 Models • Fusion 360 L9 Quiz • Fusion 360 L9 Models
Week 6	**Readings** • Chapter 10 in the Shih Textbook • Chapter 11 in the Shih Textbook • Lecture Notes **Videos** • Fusion 360 Chapter 10 – PowerPoint Slides • Fusion 360 Demo 10: Introduction to 3D Printing • Fusion 360 Chapter 11 – PowerPoint Slides • Fusion 360 Demo 11: Symmetric Features in Designs **Assessment** • Fusion 360 L10 Quiz • Fusion 360 L11 Quiz • Fusion 360 L11 Models
Week 7	**Readings** • Chapter 11 in the Shih Textbook • Chapter 12 in the Shih Textbook • Lecture Notes **Videos** • Fusion 360 Chapter 11 – PowerPoint Slides • Fusion 360 Demo 11: Symmetric Features in Designs • Fusion 360 Chapter 12 – PowerPoint Slides • Fusion 360 Demo 12 – 1: Dryer Model – Part 1

	• Fusion 360 Demo 12 – 1: Dryer Model – Part 2 **Assessment** • Fusion 360 L11 Quiz • Fusion 360 L11 Models: • Fusion 360 L12 Quiz • Fusion 360 L12 Models:
Week 8	**Readings** • Chapter 12 in the Shih Textbook • Chapter 13 in the Shih Textbook • Lecture Notes **Videos** • Fusion 360 Chapter 12 – PowerPoint Slides • Fusion 360 Demo 12 – 1: Dryer Model – Part 1 • Fusion 360 Demo 12 – 1: Dryer Model – Part 2 • Fusion 360 Chapter 13 – PowerPoint Slides • Fusion 360 Demo 13 - 1: Assembly Components • Fusion 360 Demo 13 – 2: Assembly Modeling **Assessment** • Course Project Abstract • Fusion 360 L12 Quiz • Fusion 360 L12 Model • Fusion 360 L13 Quiz • Fusion 360 L13 Model
Week 9	**Readings** • Chapter 13 in the Shih Textbook • Lecture Notes: FEA Basics **Videos** • Fusion 360 Chapter 13 – PowerPoint Slides • Fusion 360 Demo 13 - 1: Assembly Parts • FEA Basics **Assessment** • Fusion 360 L13 Quiz • Fusion 360 L13 Model • FEA Basics Quiz

Week 10	**Readings** • Lecture Notes: FEA Analysis **Videos** • Static Stress Analysis **Assessment** • Static Stress Analysis Assignment **Midterm Exam – Computer-aided Design: Fusion 360 Modeling**
Week 11	**Readings** • Lecture Notes: FEA Analysis **Videos** • Model Frequency Analysis • Nonlinear Static Stress **Assessment** • Model Frequency Analysis Assignment • Nonlinear Static Stress Assignment
Week 12	**Readings** • Lecture Notes: FEA Analysis **Videos** • Event Simulation • Structural Buckling Analysis **Assessment** • Event Simulation Assignment • Structural Buckling Analysis Assignment
Week 13	**Readings** • Lecture Notes: FEA Analysis **Videos** • Thermal Analysis • Thermal Stress Analysis **Assessment** • Thermal Analysis Assignment • Thermal Stress Analysis Assignment
Week 14	**Readings**

	• Listen to peer presentations **Videos** • Student presentation videos **Assessment** • Student Project Presentations
Week 15	**Readings** • Discussion Forum: Student Course Project Videos **Videos** • Each student project group should upload one presentation video to Youtube and publish it in the Discussion Board **Assessment** • Discussion: course projects from all student groups • **Final Exam – Finite Element Analysis**
Week 16	**N/A**