



ENGR 113.01E Product Design & Development

COURSE SYLLABUS: Fall 2026

INSTRUCTOR INFORMATION

Instructor: Edgar Narvaez, Professor

Office Location: AG/ET 222Q

Office Hours: By appointment.

Office Phone: 903-886-5474

Office Fax: 903-886-5960

University Email Address: Edgar.Narvaez@etamu.edu

Preferred Form of Communication: Email

Communication Response Time: 48 Hours for Email

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

Textbook(s) Required: Learning Autodesk Inventor 2022: Modeling, Assembly, and Analysis,
By

Randy Shih, SDC Publications.

ISBN-13: 978-1-63057-441-3

ISBN-10: 1-63057-441-4

Required Materials:

- 1) Bound notebook, such as a composition notebook (Available at the bookstore or any office supply store)
- 2) Scientific or Graphing Calculator
- 3) **Memory stick or portable storage device**

Course Description

Product development and design processes and methods, including product specifications, concept development, engineering drawings, design for prototyping, and manufacturing.

Student Learning Outcomes

1. Describe an engineering design and development process
2. Create 3D solid models of mechanical components using CAD software

The syllabus/schedule are subject to change.

3. Demonstrate individual skill using selected manufacturing techniques, including drilling, pressing, tapping, and rapid prototyping
4. Employ engineering, scientific, and mathematical principles to execute a design from concept to finished product
5. Fabricate an electromechanical assembly from engineering drawings
6. Work collaboratively on a team to successfully complete a design project
7. Effectively communicate the results of projects and other assignments in a written and oral format

COURSE REQUIREMENTS

Minimal Technical Skills Needed

The following technologies will be required for this course.

- Internet access / connection
- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint

The following technologies will be provided and utilized in the course.

- Inventor
- MultiSIM
- Prototype machines
- Manual manufacturing tools

Instructional Methods

This course will be taught face-to-face during the scheduled course time. The semester project **MUST BE completed during schedule class time as provided by the instructor or independent time for the student can be scheduled in the Makerspace.** This is a project-based course and will be presented using formats that include lectures, discussions, laboratory work, and/or group participation. Student participation and interaction is required.

Student Responsibilities or Tips for Success in the Course

GRADING

Final grades in this course will be based on the following scale:

The ***final course grade*** will be based upon the following:

<u>Assessments</u>		<u>Grading Scale</u>	
Homework/Quizzes	20%	90 – 100	A
Module 1	20%	80 – 89	B

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- Top/bottom plate solid model (5%)	70 – 79	C
- Top/bottom plate drawing. (5%)	60 – 69	D
- Plate manufacturing (5%)	<59	F
- Engineering notebook (5%)		
Module 2	20%	
- Impeller solid model (3%)		
- Impeller mfg. drawing (5%)		
- DC Motor solid model (3%)		
- DC Motor drawing (5%)		
- Engineering notebook (4%)		
Module 3	30%	
- Assembly solid model (5%)		
- Assembly drawing w/parts list (10%)		
- Mfg. process plan (10%)		
- Engineering notebook (5%)		
Final product demonstration	10%	

Late work will not be accepted and a grade of “0” will be assigned, unless prior arrangements are worked out with the instructor. The instructor has the final decision on whether late work will be accepted. Late penalties will be assessed to any approved late work.

Assessments

Homework/Class Assignments: 20% of total course grade

Student Learning Outcomes #2, #3, #4

Problems from the textbook or other resources will be assigned to support the instructional material. Students will apply theory and mathematical principles to solve applied engineering problems.

Assessment Method: Points will be allocated to each homework / classroom assignment. The total points per assignment will be based upon the number and complexity of the problems. Assignments will be graded both for accuracy as well as demonstrated knowledge of the topic being addressed. Students may work in groups to complete assignments unless otherwise specified by the instructor.

Laboratories / Engineering Notebook: 70% of total course grade

Student Learning Outcomes #1, #2, #3, #4, #5, #6, #7

Student teams will develop, design, manufacture, and test an electromechanical system (water pump). Hands-on experiences in the interpretation of

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product/customer specifications, concept development, engineering drawings, design for prototyping, and manufacturing will be utilized in the instruction of the engineering design process. Students will accurately document their product design experience through an engineering notebook.

Assessment Method: The student design project will be broken into three modules. Points will be allocated to each module based upon the complexity of the exercise. The total points will include the required documentation in an engineering notebook.

Module 1: 20%

- *Introduction to product design and development*
- *Fundamentals of 3D modeling*
- *Basic manufacturing processes*

Module 2: 20%

- *Engineering design process*
- *Proof of concept*
- *Prototyping*

Module 3: 30%

- *Assembly modeling*
- *Assembly drawings*
- *Manufacturing process plan*
- *Final assembly*
- *Testing and troubleshooting*

Laboratory work will be graded both for accuracy as well as demonstrated knowledge of the topic being addressed. Students will work in groups of two or three to develop teamwork skills. Each group will keep an accurate record of the design project in an engineering notebook. The notebook must be bound with page numbers. The notebook should be used to record key meetings as well as ideas, results, observations, references, and any other information related to a project. This includes all design ideas and tests, whether they were successfully implemented or not.

Sufficient detail should be included, which would allow someone to replicate the design and/or project with limited or no prior knowledge of the project.

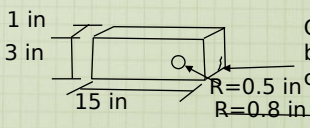
Key Guidelines:

- Entries should be legible and made in ink.
- Entries should be made at the time the work is completed rather than taking notes on scratch paper and transferring it at a later time.
- The first few pages should be reserved for the Table of Contents. The description title and associated page number should be included separately

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- for each entry made in the notebook. Ensure the title of the entry is used in the Table of Contents.
- Date each entry in the notebook.
 - Title each entry so it can be easily associated with a given project.
 - For every entry, list each person who participated in the meeting, test, or effort being documented. (e.g. sign your names)
 - Include all design iterations and tests, whether they were successfully implemented or not. The notebook should be a history of the project not just a report on the characteristics of the final product.
 - Include descriptions of the equipment and/or software used in tests and/or analyses. Software versions are critical as later versions may or may not perform in the exact same manner.
 - Line out errors, never erase.
 - Include graphics, schematics, and tables as appropriate.

A format similar to the one shown in the following examples should be used for the Table of Contents and journal entries, unless otherwise specified by the instructor. The examples are intended to represent two random pages out of a notebook

Table of Contents Meeting with supervisor to establish objectives 3 Project A - mechanical specifications 3 Project C - project time lines 4	1 3 1/15/10 Establish Work Objectives (Name of employee, Name of supervisor) Discussed potential projects for the internship. Five projects, A, B, C, D, and E were considered Funding for Project B will not be available until the middle of next month. The remaining projects meet internship requirements but only 3 were needed so A, C, and D were selected. Project A: Project... Responsibilities include... Project C: Project... Responsibilities include... Project D: Project... Responsibilities include... 1/17/10 Project A Mechanical Specifications (Name of individuals involved in effort) Dimensions measured on the field unit. 
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Final Product Demonstration: 10% of total course grade

Student Learning Outcome #1, #4, #5, #6, #7

The final demonstration will include two elements: 1) an oral presentation 2) functional demonstration of the electromechanical system operation.

Assessment Method: Each portion of the final demonstration will be worth 50 points. The oral presentation will be treated as the final design review for a customer with the grade based upon organization, technical content, time management, and basic presentation skills. The functional demonstration will verify the electromechanical system meets customer specifications. The grade will be based upon documented design specifications and pump performance.

Course Outline/Calendar

	Topic	Assignment(s)
Week 1	Module 1 - Course introduction - Engineering notebooks/documentation - Shop safety	Reading: Safety information Lab: SDS Lab Assignment: Safety quiz
Week 2	- Overview of engineering design process - Overview of manufacturing fundamentals - Electrical fundamentals	Reading: Lab: Assignment: Ohm's Law HW, Electrical Fundamentals HW
Week 3	- Fundamentals of 3D modeling	Reading: Project 1 Chapter Lab: Project 1 tutorial Assignment:
Week 4	- Fundamentals of 3D modeling - Formatting drawing sheets	Reading: Project 1 Chapter Lab: Project 1 tutorial Assignment:
Week 5	- Component development from customer specifications - Basic manufacturing processes	Reading: Lab: Top plate, bottom plate, bushing drawings; mfg top & bottom plate Assignment:
Week 6	Module 2 - DC motors - Modeling existing components	Reading: Lab: DC Motor 3D model and part drawing Assignment: DC motor HW
Week 7	- Development of a product concept	Reading: Research impeller designs Lab: Impeller 3D conceptual model Assignment: Hand drawn sketch of impeller concept Project 2 tutorial
Week 8	- Proof of concept	Reading: Project 2 chapter

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		Lab: Impeller prototype; fit test Assignment: Project 2 tutorial
Week 9	- New product design and development from conceptual model - Product manufacturing	Reading: Project 2 chapter Lab: Production impeller; drawings Assignment: Project 2 tutorial
Week 10	- Rapid prototyping - Product test	Reading: Project 2 chapter Lab: Functional test motor/impeller assembly Assignment: Project 2 tutorial 3D model + Quiz
Week 11	Module 3 - Component sourcing - Final assembly	Reading: Component Sourcing Handout Lab: Drawings - screws, o-rings, & threaded fittings drawings Assignment:
Week 12	- Assembly modeling - Assembly testing	Reading: Project 3 chapter – Exploded View – Bill of Materials Lab: Pump 3D assembly model Assignment: Portion of project tutorial 3
Week 13	- Assembly drawing with bill of materials - Assembly testing	Reading: Project 3 chapter – Exploded View – Bill of Materials Lab: Pump assembly drawing Assignment: Portion of project tutorial 3
Week 14	- Final product testing - Manufacturing Process plan	Reading: Project 3 chapter – Exploded View – Bill of Materials Lab: Pump assembly; Manufacturing process plan for pump assembly Assignment: Portion of project tutorial 3
Week 15	- Final project demonstration – Oral Presentations	Reading: Lab: Assignment:
Week 16	Final	Functional project demonstration

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TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

Zoom Video Conferencing Tool

https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@etamu.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

<https://community.brightspace.com/support/s/contactsupport>

STUDENT RESPONSIBILITIES FOR COURSE

Late work will not be accepted and a grade of "0" will be assigned, unless prior arrangements are worked out with the instructor. The instructor has the final decision on whether late work will be accepted. Late penalties will be assessed to any approved late work.

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NO Extra Credit will be given.

There will be NO re-do's, do overs or re-submits in ENGR 113.03.

CWID and Password

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@etamu.edu.

Technology-Related Issues

Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a ETAMU campus open computer lab, etc.

TECHNOLOGY REQUIREMENTS AND SUPPORT

Minimal Technical Skills Needed

Students will need reliable computer and internet access for this course. Students must be able to effectively use myLeo email, myLeo Online D2L, and Microsoft Office.

Learning Management System (LMS) – D2L

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are the technical requirements:

- View the [Learning Management System Requirements Webpage](#).
- Learn more on the [LMS Browser Support Webpage](#).

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found on the [Brightspace Support Webpage](#).

COMMUNICATION AND SUPPORT

Interaction with Instructor Statement

The syllabus/schedule are subject to change.

If you have any questions or are having difficulties with the course material, please contact your instructor. Correspondence will always be through university email (your “myLeo” mail) and announcements in myLeo online (D2L). You will not RECEIVE email through D2L, so be sure to check your ETAMU email for communication. Students are encouraged to check university email daily.

Include the Following in Emails with Instructor:

- Course name and subject in the subject line
 - Salutation (Good afternoon, Dr. Jackson)
 - Proper email etiquette (no “text” emails – use proper grammar and punctuation)
 - Student name and CWID after the body of the email (possibly add to student signature on email)
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COURSE AND UNIVERSITY PROCEDURES/POLICIES

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The [Code of Student Conduct](#) is described in detail online in the [Student Guidebook](#).

Students should also consult the [Rules of Netiquette Webpage](#) for more information regarding how to interact with students in an online forum.

ETAMU Attendance

Attendance is a vital part of this project-based course. A point deduction will be assessed to the final grade average based on the following number of absences and/or tardy:

0-1 absences	0 pt deduction
2 absences	5 pt deduction
3 absences	10 pt deduction
4 absences	20 pt deduction
5 or more	50 pt deduction

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In rare cases there may be special circumstances that justifies an excused absence. The instructor has the final decision on whether an absence is excused or not. Contact the instructor if you know that you will be absent.

For more information about the attendance policy, please view the [Attendance Webpage](#) and the [Class Attendance Policy](#)

Academic Integrity

Students at East Texas A&M University are expected to maintain high standards of integrity and honesty in all their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty University Procedure 13.99.99.R0.03](#)

[Undergraduate Student Academic Dishonesty Form](#)

[Graduate Student Academic Dishonesty University Procedure 13.99.99.R0.10](#)

[Graduate Student Academic Dishonesty Form](#)

Use of Artificial Intelligence

East Texas A&M University acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

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East Texas A&M University

Velma K. Waters Library Rm 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@etamu.edu

Website: [Office of Student Disability Services](#)

Nondiscrimination Notice

East Texas A&M University will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information, or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in East Texas A&M University buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and ETAMU Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all East Texas A&M University campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

East Texas A&M Supports Students' Mental Health – Counseling Services

The Counseling Center at East Texas A&M University, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit <https://www.etamu.edu/counseling-center/>

Mental Health and Well-Being

The syllabus/schedule are subject to change.

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.



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