Class Reference Number (CRN): **18216**
Instructor: Methaq S. Abed, Ph.D., P.E.
Emails: msabed@utep.edu
Office Hours: Virtual office hours will be offered by appointment. You are welcome anytime to send your questions via email and allow 48 hrs to respond

Class Meeting Schedule: Online
Class Duration: August 24nd, 2020 - Dec.3th, 2020

Course Description: An introduction to solid modeling concepts and software, dimensioning, and basic computer-aided engineering.

Course Objectives:

At the end of this class, the typical students should be well prepared to make drawing for any type of structures, machines, and any connection elements. The students will be able to sketch models that can be used for 3D print. Besides, the students will be able to run a simulation for their models to check the analysis required for design purposes. The objectives can be summarized as:

- Explain the design to the manufacturing process used to take a digital model to a physical part through CNC programming.
- Summarize the toolset available in Fusion 360.
- Demonstrate knowledge and skills in Fusion 360, applying design and manufacturing workflows to take digital parts to physical prototypes.

Course Content
2D Sketching
3D Modeling
Drafting
Parts Assembly
Simulation (stress/thermal)
Rendering and animation
CAM and 3D Printing
Design Projects

Course Requirements Computer capable of running Autodesk's Fusion 360.
Limited-term laptop checkout is available at the Library and Engineering Technology Center. Desktops at Library may be used to complete assignments, but Laptops will be required for quizzes and assignments.

Software	Autodesk Fusion 360
Available at	Fusion 360 |Free Software for Students and Educators | https://www.autodesk.com/education/edu-software/overview?sorting=featured&page=1

Grading

Homeworks (11)	1100
Discussion boards (6)	300
Assessments (quizzes-3)	300
Projects (2)	500
Total Points	2200

Grading Scale:

The final grade will be calculated based on the points you have accumulated as follows:

A ≥ 1900
1900 ≥ B >1700
1700 ≥ C > 1500
1500 ≥ D > 1275
1275 ≥F

The instructor reserves the right to revise this grading plan. However, the students will be informed of any changes during the semester.

Homework: The description for each homework assignment will be posted on Blackboard, and the due date for each assignment will be on Sunday at 11:59 pm.

Projects: There will be one individual and one team project in this course. Both projects will challenge you to apply the materials covered in class and force you to apply knowledge from outside the class to complete it. Project 1 (team effort) will cover all the fundamentals of Modeling, and it will include a functional assembly. Project 2 (individual effort), it will cover modeling and simulation fundamentals that will be applied to a real-life problem.

Discussion boards: for this online course, students will be required to participate in discussion boards – both an initial post and responses to their peers. Students will also have a collection of smaller assignments throughout the week that will work to build toward larger projects. Each of these activities will be given point values that add up to the total 300-point participation grade. These points cannot be made up.

Homework and Projects' Policy

To pass this class, the student MUST demonstrate proficiency with the concepts and software. If a student misses 50% of the assigned homework and one project, the instructor has the right to drop him/her from class or assign an "F" grade for the class.

Drop/Withdrawal Deadline: Oct.30th, 2020.

Technology Requirements

Course content is delivered via the Internet through the Blackboard learning management system (LMS). Ensure your UTEP email account is working and that you have access to the Web. You may use any of the primary Web browsers—Explorer, Google Chrome, Firefox, Safari, etc. When having technical difficulties, try switching to another browser.

You will need to have or have access to a computer/laptop, printer, scanner, a webcam, and a microphone. You will need to purchase a USB (flash drive). You will need to download or update the following software: Microsoft Office, Adobe, Flashplayer, Windows Media Player, QuickTime, and Java. Check that your computer hardware and software are up-to-date and able to access all parts of the course. If you encounter technical difficulties of any kind, contact the Help Desk.

Netiquette

o Always consider the audience. Remember that members of the class and the instructor will be reading any postings.

o Respect and courtesy must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.

o When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a F2F situation.

o Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professors only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space. If students wish to do so, they have the ethical obligation to first request the permission of the writer(s).

Drop Policy

To drop this class, please contact the Registrar's Office to initiate the drop process. If you cannot complete this course for whatever reason, please contact me. If you do not, you are at risk of receiving an "F "for the course.

Accommodations Policy

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services.

Scholastic Integrity

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) for possible disciplinary action. To learn more HOOP: Student Conduct and Discipline.

Student Resources

UTEP provides a variety of student services and support:

UTEP Library: Access a wide range of resources, including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.

Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in-person if on campus.

University Writing Center (UWC): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.

Math Tutoring Center (MaRCS): Ask a tutor for help and explore other available math resources.

History Tutoring Center (HTC): Receive assistance with writing history papers, get help from a tutor, and explore other history resources.

Military Student Success Center: UTEP welcomes military-affiliated students to its degree programs, and the Military Student Success Center and its dedicated staff (many of whom are

veterans and students themselves) are here to help personnel in any branch of service to reach their educational goals.
RefWorks: A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

ACES & Tutoring Center

Please note there are tutoring services available in the ACES center. Tutoring is free to you; the Department pays them. If tutors are not used, the Department may stop funding them. Check the schedule of the tutors and make use of the services. For more details, visit the

ME Advising Blackboard -> cc mech acadav: MECH Academic Advising -> Tutoring & Resources

At the link, you can find tutor schedules, location of the ACES center, and the list of tutors available. For more information, send email to METutors@utep.edu

Harassment Policy

The Department has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment will be reported to the proper authorities. In addition to generally understood forms of harassment, the Department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made, or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment, but repeated questions about a grade or an administrative decision are.
- Grades are NOT negotiable, ever. If you believe a grading mistake has been made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.

Tentative Class Schedule:

Week	Topics	Reading/Watch	Assessments
1	-Introduction -What's Fusion 360? - File and Project ---	- Installation of Fusion 360 - Example -Create a New Project and a New Folder in a Project. -Accessing and Customizing Tools. -Understanding Bodies and Components. -Capture Design History	-Syllabus quiz -Discussion board-1(Introduction): due on

	Administration	Watch videos in the link/Complete lessons 1-4 **Link:** https://academy.autodesk.com/course/137992/introduction-mechanical-engineering-design-and-manufacturing	Sunday at 11:59 pm.
2	-2D Sketches	-Create a Sketch. -Fully Define a Simple Sketch -Define Constraints with Example -Polygon Tools -Gear Example -iPhone Example Watch videos in the link/Complete lesson 5 **Link:** https://academy.autodesk.com/course/137992/introduction-mechanical-engineering-design-and-manufacturing	H.W.#1 due on Sunday, Sept 6th, at 11:59 pm -Submit a screenshot of your model after step 2 in lesson 5 -Submit a screenshot of your final model after lesson 3.
3	2-3D Sketches -Basics of Feature Creation -Basic of Feature Modification	-Extrude -Revolve -Sweep -Create and Shell Drafted Part. -Create a Revolve -Apply Fillets to a Model -Create a Feature Pattern Watch videos in the link/Complete lessons-6&7. **Link:** https://academy.autodesk.com/course/137992/introduction-mechanical-engineering-design-and-manufacturing	H.W.#2 due on Sunday, Sept.13th, at 11:59 pm Submit a screenshot of your model after lesson 7, and the final model for the attached Crankshaft.
4	- Saving an STL File for 3D Printing - Mechanical Motion with Assembly Joints	-Export an STL File -Apply an as-Built Joint -Drive and Animate a Joint -Edit a Joint Limit -Explode a Component -Create a Rendering -Create a Detailed Drawing from the Animations. -Add Parts of a Table	H.W.#3 due on Sunday, Sept 20th, at 11:59 pm Complete the challenging assignment in

	-Animations and Rendering - Detailed Drawing	-Add Drawing Dimensions Watch videos in the link/Complete lessons 8-11 **Link:** https://academy.autodesk.com/course/137992/introduction-mechanical-engineering-design-and-manufacturing	step 7 from lesson 11.
5	Integrated Manufacture Workspace - Integrated Simulation Workspace	-Define a New Tool -Create a Facing Toolpath -Create a Contour Toolpath -Simulate a Program -Export an NC File -Use Simplify to Remove Bodies -Select a Simulation Material -Activate Automatic Contacts -Solve and Review a Simulation -Add Load Conditions -Clone a Simulation Model Watch videos in the link/Complete lessons12&13 **Link:** https://academy.autodesk.com/course/137992/introduction-mechanical-engineering-design-and-manufacturing	H.W.#4 due on Sunday, Sep.27th, at 11:59 pm Complete the challenging assignment in step – 10 from lesson-13 Discussion board due on Saturday, at 11:59 pm.
6	- Course Challenge Assignment	Course Challenge Assignment in lesson 14 https://academy.autodesk.com/course/137992/introduction-mechanical-engineering-design-and-manufacturing Note: data resources are available for students in lesson-1 step-4. Quiz (1)	H.W.#5 due on Sunday, Oct.4th, at 11:59 pm. Complete the course challenge assignment in lesson-14 Discussion board due on Saturday, at 11:59 pm.
7	-3D Modeling	- Enroll in this course/ https://academy.autodesk.com/course/126271/introduction-3d-modeling	H.W.# 6 due on Sunday,

		(Complete lessons 2 to 4, &6) -Intro to CAD 2D/3D Modeling Overview -Intro to CAD 2D/3D Modeling Simple Exercise -Intro to CAD 2D/3D Modeling Workspaces -Intro to CAD 2D/3D Modeling_ Parametric Modeling	Oct.11th, at 11:59 pm Complete the challenge assignment-2 in lesson 12 Discussion board due on Saturday, at 11:59 pm.
8	-3D Modeling	-Intro to CAD 2D/3D Modeling Freeform Sculpt -Intro to CAD 2D/3D Modeling_Direct Modeling Watch videos in the link/Complete lessons 7&8 **Link:** https://academy.autodesk.com/course/126271/introduction-3d-modeling	H.W.#7 due on Sunday, Oct.18th, at 11:59 pm Complete the challenge assignment-3 in lesson 12
9	-Assembly	-Intro to CAD 2D/3D Modeling_ Assembly Modeling -Intro to CAD 2D/3D Modeling_ Drawing Documentation Watch videos in the link/Complete lessons 9&10 **Link:** https://academy.autodesk.com/course/126271/introduction-3d-modeling **Quiz (2)**	H.W.#8 due on Sunday, Oct 25th, at 11:59 pm. Complete the challenge assignment-1 in lesson 12
10	Introduction to CAD and CAE Using Fusion 360	Enroll in the course below: https://academy.autodesk.com/course/120630/introduction-cad-and-cae-fusion-360 Complete week -4 lessons -Assemblies Lecture -Assemble References	H.W.#9 due on Sunday, Nov 1st, at 11:59 pm. Complete the assignment in step-6 from week-4 in this course

			- Submit the team contract (in Welcome Module) by Sunday, Nov.1st, at midnight.
11	Simulation – Static Stress	-Linear Structural Analysis _Lecture -Linear Structural Analysis _References Watch videos in the link/Complete lessons in week-8 **Link:** https://academy.autodesk.com/course/120630/introduction-cad-and-cae-fusion-360	H.W.#10 due on Sunday, Nov.8th, at 11:59 pm. Complete the assignment in step- 6 from week -8 in this course
12	Simulation – Thermal – and Thermal Stress	-Simulation CFD and Thermal Analysis Lecture -Simulation –Thermal- Reference Watch videos in the link/Complete lessons in week-10 **Link:** https://academy.autodesk.com/course/120630/introduction-cad-and-cae-fusion-360	H.W.#11 due on Sunday, Nov.15th, at 11:59 pm Complete the assignment in step -6 from week -10 in this course
13	CAM and CNC Manufacturing Model and Assemble a 3D Printer-z Axis	- CAM and CNC Manufacturing- Lecture - CAM 1- Tool Library Steps - CAM 2- Setup Steps - CAM 3- Adaptive Overview Steps - CAM 4- 2D Finishing Steps - CAM 5- Finishing Steps - CAM 6- Stock Simulation - CAM 7- Toolpath Management Steps - CAM 8- Post Process Steps Watch videos in the link/Complete lessons in week-12 **Link:** https://academy.autodesk.com/course/120630/introduction-cad-and-cae-fusion-360 **Model and Assemble a 3D Printer –z Axis**	H.W.#12 due on Sunday, Nov.22nd, at 11:59 pm Discussion board due on Sunday at 11:59 pm Post on discussion board the team's project progress

		Use the link below: https://academy.autodesk.com/course/133262/model-and-assemble-3d-printer-z-axis Quiz (3)	
14	Generative Design	- Generative Design Mindset - Shape Optimization vs. Generative Design - Preserve Geometry - Create Obstacle Geometry for Motor Mounts - Create Obstacle Geometry for the Gas Tank and Motor - Generative Design Loads and Constraints - Set Generative Design Objectives - Understanding Manufacturing Design Objectives - Solve a Generative Study - Explore Generative Outcomes - Explore Manufacturing Outcomes - Create a 3D Design from a Generative Outcome - Review a Generative Model - Edit a Generative Model - Setup a Simulation Study - Analyze Simulation Results OR Complete the lessons (1,3,4,5,& 6) in the link below: https://academy.autodesk.com/course/134986/introduction-generative-design	Discussion board due on Sunday at 11:59 pm Post on discussion board the team's project progress
15	Design Project #1	(Team project) -The description listed in the project's file.	Submit it by Thursday, Dec.3rd, at 11:59 pm.
16	Design Project#2	(Individual project) - The description listed in the project's file. **(This is the week of the final exam)**	Submit it by Tuesday, Dec.8th, at 11:59 pm

The above schedule, policies, and assignments in this course are subject to change in the event of extenuating circumstances or by mutual agreement between the instructor and the students.