

The University of Texas at El Paso
Department of Aerospace and Mechanical Engineering
Syllabus

COURSE INFORMATION

MECH 2132: Additive Manufacturing Lab

CRN: 25584

Term: Spring 2024

Delivery Method: In-Person

Meeting Day and Time: Mondays and Wednesdays, 9:00 – 10:20 am

Location: Liberal Arts Building Room 209

INSTRUCTOR INFORMATION

David Espalin, Ph.D., Associate Professor

Written Communication: email or MS Teams

Phone Number: (915) 747-6078

Office Location: Engineering Building, Room 312

Office Hours:

- Mondays: 1:00 – 2:30 pm (in-person)
- Tuesdays: 9:00 – 10:30 am (MS Teams)

Teaching Assistant: Juan Pablo Garcia Chavira, B.S., Graduate Research Assistant

Written Communication: email or MS Teams (jgarciacha@miners.utep.edu)

Office Hours:

- Tuesdays: 3:00 – 4:00 pm (MS Teams)
- Wednesdays: 11:00 am – 12:00 pm (in-person)

COURSE DESCRIPTION AND GOALS

MECH 2132 is a required 3-credit course for students majoring in Aerospace and Mechanical Engineering. The course, Additive Manufacturing Lab, will discuss various aspects of additive, subtractive, and joining processes to form three-dimensional parts with applications ranging from prototyping to production. 3D Printing (3DP) or Additive manufacturing (AM) technologies fabricate three-dimensional (3D) parts using layer-based manufacturing processes directly from computer-aided-design (CAD) models. A major current emphasis of AM is on using these technologies in direct manufacturing of end-use parts. In this course, you will learn about AM and other manufacturing technologies, get hands-on experience on the material extrusion process, and some of the important challenges associated with using these technologies.

COURSE OBJECTIVES AND UNIVERSITY LEARNING OUTCOMES

Upon completion of this course, each student should be able to:

- Identify material classes and manufacturing processes.
- Provide a comprehensive overview of 3D Printing technologies including design and 3DP-specific software and post-processing/part finishing approaches.
- Explain the capabilities, limitations, and basic principles of material extrusion AM.
- Fabricate parts using the material extrusion AM process
- Apply 3DP techniques (including CAD) in the design and prototyping of components using AM technologies.

REQUIRED MATERIALS

Computer: Students will be required to produce solid models using Autodesk Fusion 360. Students are required to use a computer with minimum system requirements as required by the software.

Textbook (optional): Fundamentals of Modern Manufacturing: Materials, Processes, and Systems 7th Ed. by Mikell P. Groover, Wiley, 2019, ISBN: ISBN: 978-1-119-47521-7

Textbook (optional): Additive Manufacturing Technologies : Rapid Prototyping to Direct Digital Manufacturing 2nd Ed. by Ian Gibson, David W. Rosen, Brent Stucker, Springer, 2015, ISBN: 978-1-4419-1119-3

In addition to the listed references, students are encouraged to search current literature on the topic of additive manufacturing and 3D Printing since they provide the most current advances and developments in AM and these could be helpful for a broader understanding of the subject.

ASSIGNMENTS AND GRADING

Your grade for this course will be assessed based on the following weights: 10% for attendance, 20% for quizzes, 30% for two exams, and 40% for individual and group projects. The content of a quiz could be the materials covered in previous sessions or to be covered that day. There will be no make-up quizzes. No late work will be accepted for projects and other deliverables. Make-up exams will be given only for extremely credible reasons.

GRADING

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

A	≥90
B	≥80 but <90
C	≥70 but <80
D	≥60 but <70
F	<60

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

TECHNOLOGY REQUIREMENTS

Some course content is delivered via the Internet through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You will need to have access to a computer/laptop. You will need to download or update Microsoft Office (or similar) to create presentations. This class will implement various software packages offered by Autodesk, specifically [Fusion 360](#). Therefore, students are encouraged to visit the software website for system requirements. Installation instructions will be provided

through lectures. When creating profiles, please use your UTEP email address as privileges from Autodesk will recognize your UTEP email address.

If you do not have word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about [Microsoft Office 365](#) and follow the instructions.

IMPORTANT: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP [Help Desk](#) as they are trained specifically in assisting with technological needs of students. Please do not contact me for this type of assistance. The Help Desk is much better equipped than I am to assist you.

COURSE COMMUNICATION:

Here are the ways we can keep the communication channels open, the Teaching Assistant for this course is the main person responsible for communication with the students:

- Office Hours: I will have office hours for your questions and comments about the course. My office hours are in-person and virtual. Please see the days and times at the top of this syllabus.
- Email and MS Teams messages: UTEP e-mail and MS Teams messages are the best way to contact me. I will make every attempt to respond to your e-mail within 24 hours of receipt. When e-mailing me, be sure to email from your UTEP student e-mail account and please put the course number in the subject line. In the body of your e-mail, clearly state your question. At the end of your e-mail, be sure to put your first and last name, and your university identification number.
- Announcements: Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

ATTENDANCE AND PARTICIPATION

Our class meeting is in-person as listed on page 1.

Attendance in class is mandatory because the required information will be delivered during regular class time and there will be frequent in-class assignments and group activities. No make-up classes will be offered so it is important that you attend class. The class instructor reserves the right to automatically drop students having more than three unexcused absences. Attendance can be checked by the instructor through quizzes, exams, roll calling, randomly picked names to solve a problem or participate in class, or other mechanisms.

ILLNESS PRECAUTIONS

Please stay home if you have symptoms of a communicable illness. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations.

EXCUSED ABSENCES AND/OR COURSE DROP POLICY

According to UTEP Catalog, "At the discretion of the instructor, a student can be dropped from a course because of excessive absences or lack of effort. A grade of "W" will be assigned before the course drop deadline and a grade of "F" after the course drop deadline." See Policies and Regulations in the UTEP Undergraduate Catalog for a list of excuse absences. Therefore, if I find that, due to non-performance in the course, you are

at risk of failing, I will drop you from the course. I will provide 24-hour advance notice via email.

OR

I will not drop you from the course. However, if you feel that you are unable to complete the course successfully, please let me know and then contact the Registrar's Office to initiate the drop process. If you do not, you are at risk of receiving an "F" for the course.

DEADLINES, LATE WORK, AND ABSENCE POLICY

Assignments

- Deadlines for each assignment will be communicated when assigned. No late work will be accepted if the reason is not considered excusable.

MAKE-UP WORK

Make-up work will be given *only* in the case of a *documented* emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

ALTERNATIVE MEANS OF SUBMITTING WORK IN CASE OF TECHNICAL ISSUES

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. If you are experiencing difficulties submitting your work through Blackboard, please contact the UTEP Help Desk. You can email me your document as a last resort.

INCOMPLETE GRADE POLICY

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations to students with documented disabilities. Students who become pregnant may also request reasonable accommodation, in accordance with state and federal laws and regulations and University policy. Accommodations that constitute undue hardship are not reasonable. To make a request, please register with the UTEP Center for Accommodations and Support Services (CASS). Contact CASS at 915-747-5148, email them at cass@utep.edu, or apply for accommodations online via the CASS portal.

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 one's 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, please visit [HOOP: Student Conduct and Discipline](#).

GUIDANCE ON ARTIFICIAL INTELLIGENCE

Using AI for brainstorming

Some AI technologies or automated tools, particularly generative AI such as [ChatGPT](#) or [DALL-E](#), can be beneficial during the early brainstorming stages of an activity, and you are welcome to explore them for that purpose. However, keep in mind that AI-generated ideas are not your own and may hinder your ability to think critically and creatively about a problem. It is also important to remember that these technologies often “hallucinate” or produce materials and information that are inaccurate or incomplete—even providing false citations for use.

That said, you are not allowed to submit any AI-generated work in this course as your own. If you use any information or materials created by AI technology, you are required to cite it like you would any other source. Consider how this will affect your credibility as a designer and engineer before doing so. Any direct use of AI-generated materials submitted as your own work will be treated as plagiarism and reported to the Office of Student Conduct and Conflict Resolution (OSCCR).

PLAGIARISM DETECTING SOFTWARE

Some of your course work and assessments may be submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used to review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

COURSE RESOURCES: Where you can go for assistance

UTEP provides a variety of student services and support. Please refer to the QR code below for a listing of campus resources or visit https://www.utep.edu/advising/student_resources/student-success-resource-hub.html.

