MECH 5353 (CRN 17532): Advanced 3D Engineering and Additive Manufacturing

Fall 2022, MW 1:30 – 2:50 PM
Liberal Arts Building Room 122

INSTRUCTOR: David Espalin (Assistant Professor, e-mail: despalin@utep.edu)

OFFICE HRS: Monday 11:00 AM – 12:00 PM
Wednesday 11:00 AM – 12:00 PM and 3:00 PM – 4:00 PM
or by appointment
office location: Engineering Building, room A105

CLASS MEETING FORMAT: Lectures will be delivered in-person during the listed days and times at the listed location. Attendance is mandatory as it enhances understanding of course content.

COURSE DESCRIPTION AND GOALS

The MECH 5353 course is the final instruction-based class towards the Graduate Certificate in 3D Engineering and Additive Manufacturing (AM). The course is targeted to students registered in the certificate program and who have taken or are taking the progression of classes consisting of MECH 5351, MECH 5352, MECH 5354, and MECH 5355, or to those who have demonstrated knowledge equivalent to the topics covered in those classes. This class will focus on advanced and recent topics of interest in AM and related technologies, specifically focusing on Material Extrusion of thermoplastics and Laser Powder Bed Fusion of metals. Topics of interest that will be discussed include but are not limited to:

- Relationships between Material Properties and Processing
- Recent Advancements in Manufacturing related to AM
- Advanced Concepts in Polymers and Metals AM
- Monitoring, Qualification and Certification Efforts

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

- Discuss the recent advances in AM, either in research or commercially available machines
- Describe the material properties that impact processing conditions
- Discuss the material extrusion and laser powder bed fusion processing conditions that have a profound impact on fabrication output

METHOD OF EVALUATION

All assignments must be submitted on time. **No late assignments will be accepted and a grade of zero (0) will be assigned for any work not delivered on time. Your grade for this course will be assessed based on your assignments, projects, and exams.** The specifics of each assignment and project will be discussed as the semester unfolds. At least two non-cumulative exams will be given. No late work will be accepted. The weight percentages given to each item are:

- Exams 50%
- Projects 20%
- Assignments and attendance 30%

GRADING

Your final grade will be calculated based on the points you have accumulated relative to the maximum available points; the percentage of which will be assigned to a letter grade as follows:

A 90 – 100%
B 80 – 89%
C 70 – 79%

D 60 – 69%
F 59% or less

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

COVID-19 PRECAUTIONS

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID 19 testing.

For inforThe Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 For information about the current rates of COVID-19, testing, and vaccinations, please visit the following resources:

- UTEP Student Health and Wellness Center: https://www.utep.edu/chs/shc/covid-19-information.html
- UTEP EH&S: https://www.utep.edu/ehs/covid/
- epstrong.org
- CDC: https://www.cdc.gov/media/releases/2022/p0811-covid-guidance.html

*** For further class policies, please refer to the MECH 5353-Class Addendum**