

MECH 2132 (CRN 26963): Additive Manufacturing Lab  
Spring 2023, MW 9:00 – 10:20 am  
Liberal Arts Building Room 209

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**Office:** David Espalin, Engineering Building Rm. A105

**Office Hours:** Monday 11:00 AM – 12:00 PM

Wednesday 11:00 AM – 12:00 PM and 3:00 PM – 4:00 PM or by appointment

**Course Description and Goals:**

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.

**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.

**TEXTS (optional):**

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

Additive Manufacturing Technologies : Rapid Prototyping to Direct Digital Manufacturing 2<sup>nd</sup> 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.

**ATTENDANCE AND CLASS PARTICIPATION:**

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.

**ASSIGNMENT DEADLINES:**

All assignments must be submitted on time at the beginning of class the day the assignment is due or at the specified due date. **No late assignments will be accepted and a grade of zero (0) will be assigned for any work not delivered on time.**

**ACADEMIC DISHONESTY:**

Scholastic dishonesty is the attempt of any student to present the work of another as their own work, any work which they have not honestly performed, or attempting to pass any examination by improper means. Scholastic dishonesty is a serious offense and will not be tolerated. **Appropriate University policies and procedures will be followed for suspected scholastic dishonesty.** You are encouraged to discuss any aspect of the course with classmates and project team members, but do not plagiarize the work of others by copying from the web, other students, articles, or other sources without properly referencing your sources. See Class Addendum for further information.

**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.

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

- A      $\geq 90$
- B      $\geq 80$  but  $< 90$
- C      $\geq 70$  but  $< 80$
- D      $\geq 60$  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.