

MENG 4350 – Advanced Manufacturing
Course Syllabus

Semester / Year	Fall 2024
Catalog Description	Introduction to Manufacturing, Materials in Manufacturing, Manufacturing Process and Systems Design, Metal Additive Manufacturing, Nano- and Micro-fabrication of Electronic Components, Manufacturing Process Controls, and Manufacturing Economy.
Prerequisites	MENG 3319
Section Number	050 - 051
Instructor Name	Hamed Hosseinzadeh
Contact Information	Email: Hamed@uttyler.edu
Class Type / Instruction Mode / Location	Face to face / Lecture / Ratliff Building North 02011/Houston Engineering Ctr 0A218
Class Time	MoWe 5:00PM - 6:20PM
Office Hours	Tuesday: 11:00 am - 12:30 pm, Thursday: 11:00 am – 12:30 pm or by appointment
No. of Credits	3
Required Textbook	Harik, R., Wuest, T., Introduction to advanced manufacturing, SAE International, 2019.
Optional References	Kalpakjian, S., Manufacturing Processes for Engineering Materials, 6th edition, Pearson, 2021. May, Gary S., Costas J. Spanos, Fundamentals of semiconductor manufacturing and process control. John Wiley & Sons, 2006. Montgomery, D.C., Introduction to statistical quality control. John Wiley & Sons, 2019. Bonvillian, William B., Peter L. Singer, Advanced manufacturing: The new American innovation policies, MIT Press, 2018. Ogata, Katsuhiko, Modern Control Engineering, 5th edition, 2010.
Additional Rules and Requirements	Students are permitted to use AI tools like ChatGPT, Copilot, and similar programs for specific assignments as designated by the instructor in this course.
Evaluation Method	Homework 10% Midterm 30% Final Exam 45% Project 15%
Grading Policy / Scale	Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60
Important Events / Dates	https://www.uttyler.edu/schedule/files/2024-2025/academic-calendar-2024-2025-main-20240222.pdf



Attendance / Makeup policy / other rules	Attendance at every class meeting is strongly encouraged. There will be no makeup for missed in-class work. An opportunity to make up a missed exam may be available to students with a university-validated and excused absence. If you have a valid reason to be absent and know ahead of time, you can discuss possible accommodations directly with the instructor.
Course Learning Objectives / ABET & PEOs Relation	By the end of this course, students will be able to: <ol style="list-style-type: none"> 1. Define general manufacturing terminology, and describe related industries, products, and capabilities. 2. Describe materials engineering concepts in manufacturing, manufacturing processes, and systems, with a focus on additive manufacturing. 3. Design metal additive manufacturing systems. 4. Design nano- and micro-fabrication processes of electronic components 5. Describe manufacturing process controls and quality measures 6. Incorporate economic factors into manufacturing
Tentative Topics / Course Plans	<ul style="list-style-type: none"> - What is manufacturing with general definitions of industries, products, and capabilities - Physical and mechanical properties of engineering materials (metals, polymers, ceramics, and composites) - Manufacturing processes: Casting, welding, metal forming, machining process, powder metallurgy, micro- and nano-fabrications, additive manufacturing, Subtractive manufacturing - General discussions about the assembly operations - Comprehensive discussions about the metal additive manufacturing methods: powder bed fusion, direct energy deposition, and binder jet methods, the challenges, and applications - Comprehensive discussions about nano- and micro-fabrication of electronic components, the challenges, and applications - Discussions about the manufacturing process control with a focus on digital shadow and twins methods plus stochastic control systems with related statistical analysis - Discussions about the manufacturing economy
University Policies	https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information.pdf