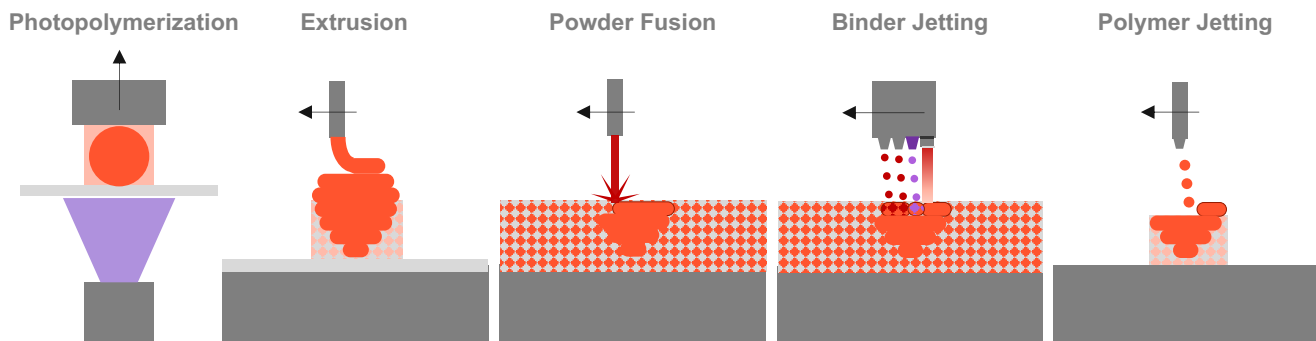


# ME 598: ADDITIVE MANUFACTURING: PROCESSES FOR POLYMERIC MATERIALS

**INSTRUCTOR:** Sameh Tawfick  
[tawfick@illinois.edu](mailto:tawfick@illinois.edu)  
Office Hours TBD

**Goal:** Understand the basics of the processes, materials, and applications of additive manufacturing (AM) of polymeric materials. By studying the governing physics, chemistry, and other relevant material properties, the course will enable you to innovate by contributing to the AM technology spectrum.



**Prerequisite:** ME 330 + (ME 310 or ME 320); or consent of instructor.

**Credit:** 4 hours for graduate students.

**Time:** MW 3-4:20 pm

**Grading:** 50% Homework; 30% Exams; 20% Student Presentations.

**Readings:** Book Chapters, Research Articles, and Patents will be posted.

## Important notes:

1. DO NOT USE REGULAR EMAIL! Instead use the messaging through Canvas.
2. Five HW will be assigned. Students can discuss HW but submit individually. If you collaborate with other students or use ChatGPT, you are required to list their names/indicate the use.
3. HW submission and format: add your name to the header; neat hand-writing, PDF only. HW filename should be: "last\_HW#\_ME598.pdf".
4. Exams format might be online, take-home, multiple choice, and/or closed-book. If closed book, formulas will be provided by the instructor.
5. If you can't take an exam, please contact the instructor a week in advance.
6. Assignments deadline is at 3 pm on the specified date. Late assignments will be penalized 10% per day. An excused extension request must be submitted 48 hours in advance of the deadline.
7. Re-grading can only be officially requested by using the comments function in PDF with questions/concerns on the relevant parts in the lecture following HW return.
8. Student presentation will be a group assignment.

	<b>Day</b>	<b>Topic</b>
M	8/21	Intro to AM of Polymeric Materials
W	8/23	Polymers Synthesis, Structure, and Properties
M	8/28	Crystalline Polymers and Calorimetry
W	8/30	Photopolymerization (Invited Seminar)
M	9/4	Labor Day
W	9/6	Flow, Rheology and Viscoelasticity
M	9/11	Vat Photopolymerization Kinetics
W	9/13	DLS Dual Cure (Carbon, Inc)
M	9/18	DLS Resolution (Carbon, Inc)
W	9/20	Two-photon Polymerization
M	9/25	Laser Scanning Optomechanics
W	9/27	No Class
M	10/2	Direct Ink Writing (DIW)
W	10/4	Rheology for DIW
M	10/9	Composite DIW (Invited Seminar)
W	10/11	Mid Term Exam
	<b>Day</b>	<b>Topic</b>
M	10/16	Gel Embedded DIW
W	10/18	FDM - Heat Transfer
M	10/23	FDM - Infill, Support, and Tool Path
W	10/25	SLS/SLM
M	10/30	Ink and Binder Jetting
W	11/1	Frontal Polymerization AM (Invited Seminar)
M	11/6	Polymer Jetting (Polyjet)
W	11/8	HP MultiJet Fusion
M	11/13	AM Composites
W	11/15	Smart Metrology (Invited Seminar)
M	11/20	Fall Break
W	11/22	Fall Break
M	11/27	Student Presentations
W	11/29	Student Presentations
M	12/4	Student Presentations
W	12/6	Student Presentations
W	12/TBD/2023	Final Exam