

**ME/SEP 735**  
**Additive Manufacturing**  
**Fall 2021**

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**Course Description**

This course covers basic overview of additive manufacturing processes including powder bed fusion processes, and beam deposition processes. The course will deal with issues related to design for additive manufacturing, applications, and quality aspects.

**Schedule and Mode of Delivery**

Lectures: Fridays 5:30 p.m. - 8:30 p.m. ET  
Mode of delivery: Synchronous online  
Classroom: Microsoft Teams

**Instructor Contact Information**

Course instructor: Dr. Mostafa Yakout  
Email address: mohamemy@mcmaster.ca  
Office hours: Online, by appointment

**Course Topics**

Week	Topic	Learning activities
1	Introduction to Additive Manufacturing	
2	Additive Manufacturing Processes	▪ Online lectures ▪ Reading material
3	Powder-Bed Fusion	▪ Assignment 1
4	Solidification of Metals	
5	Applications of Additive Manufacturing <i>-- Student-centered Learning --</i>	▪ Online lectures
6	Process Mapping for Additive Manufacturing	▪ Reading material
7	Monitoring in Additive Manufacturing	▪ Assignment 2
8	Design for Additive Manufacturing	
9	Post-Processing in Additive Manufacturing	▪ Online lectures
10	Hybrid Additive Manufacturing	▪ Reading material
11	Costs of Additive Manufacturing	▪ Project report
12	<i>-- Project Presentations --</i>	▪ Project presentation

## Course Evaluation

Component	Tentative Due Date	Weight
Assignment 1	Friday October 08, 2021	20%
Assignment 2	Friday November 05, 2021	20%
Project Proposal	Friday October 22, 2021	5%
Project Report	Friday November 26, 2021	35%
Project Presentation	Friday December 03, 2021	10%
Pop Quiz		10%
<b>Total</b>		<b>100%</b>

## References

- [1] Bourell D.L., Frazier, W., Kuhn, H., Seifi, M. (editors). *ASM Handbook, Volume 24: Additive Manufacturing Processes*. ASM International 2020.
- [2] Gibson, I., Rosen, D., Stucker, B. *Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing*. 2nd Edition. Springer 2015.
- [3] Yadroitsev, I., Yadroitsava, I., Du Plessis, A., MacDonald, E. (editors). *Fundamentals of Laser Powder Bed Fusion of Metals*. 1st Edition. Elsevier 2021.
- [4] Standards under the Jurisdiction of the ASTM Committee F42 on Additive Manufacturing Technologies, as well as selection of published articles.

## Online Classroom

The course material will be delivered online through live lectures using Microsoft Teams. Students will receive a message in their McMaster's email when they have been added to the classroom. They should download Microsoft Teams to their computer, then use their McMaster ID and password to login.

## Policy Statement

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. Academic dishonesty includes, but not limited to, plagiarism and improper collaboration in group work.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at <https://secretariat.mcmaster.ca/app/uploads/Academic-Integrity-Policy-1-1.pdf>

## Conduct Expectations

As a McMaster graduate student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

### **Academic Accommodation of Students with Disabilities**

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or [sas@mcmaster.ca](mailto:sas@mcmaster.ca) to make arrangements with a Program Coordinator. For further information, consult McMaster University's *Academic Accommodation of Students with Disabilities* policy.

### **Academic Accommodation for Religious, Indigenous or Spiritual Observances (RISO)**

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office *normally within 10 working days* of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

### **Copyright and Recording**

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

### **Extreme Circumstances**

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.