Western University
Department of Mechanical & Materials Engineering

MME 4490A/B – Engineering in a Global Context: Advanced Manufacturing

COURSE OUTLINE - 2025-2026

CALENDAR DESCRIPTION:

The course focuses on advanced manufacturing topics such as enhanced product development, modeling, and fabrication techniques as well as the emerging Industry 4.0 concept. The international context of the course is expected to strengthen students' skill and understanding of manufacturing, as performed in a global and interconnected economy.

COURSE INFORMATION:

Instructor:	Dr. Remus Tutunea-Fatan, PEng Office: ACEB 3462 Phone: (519) 661-2111, ext. 88289 Email: rtutunea@eng.uwo.ca
Lectures:	28 hours (abroad*, May 8 – 23, 2026)
Hands-on activities (laboratories, mandatory field trips, project)	28 hours (abroad*, May 8 – 23, 2026)

* The "abroad" component of the course will take place at the partner academic institution, namely Karlsruhe Institute of Technology (KIT), Germany. All course activities scheduled at the partner institution (in-class lectures/labs, technical field trips, etc.) will be concentrated in the form of a two-week academic visit to KIT between May 8 and May 23, 2026.

PREREQUISITES:

Enrolment in the third year of the Mechanical, Mechatronic or Integrated Engineering program. Students enrolled in the third year of other Western Engineering or other Canadian Engineering programs are also eligible to enroll, subject to the approval of their own home program.

CONSULTATION HOURS:

By advance notice via email or drop in.

ACCREDITATION UNITS:

Engineering Science = 100%

TOPICS:

- Product development
- Manufacturing of composite components for automotive applications
- Machining of fiber-reinforced composites
- Circular economy in manufacturing
- AI augmentation of manufacturing processes
- Automated manufacturing systems

LEARNING OUTCOMES

Upon the successful completion of the course, students will:

- Understand and evaluate the principles underlying the manufacturing processes and systems presented in the course
- Apply manufacturing concepts during hands-on laboratory activities and related experiential learning exercises

- Assess how advanced manufacturing topics, such as composite processing, machining, automation, AI augmentation, and circular economy concepts, are implemented in industrial practice
- Develop the ability to identify and address manufacturing problems arising in an international context
- Demonstrate an international perspective on engineering practice in a global industrial environment

CONTACT HOURS:

2 lecture hours/week, 2 laboratory hour/week, 0.5 course

RECOMMENDED TEXTBOOKS:

Not applicable.

EVALUATION:

The final course grade will be determined based on a take-home exam to be assigned submitted at the beginning of the next academic year (Fall 2026 term).

All course activities are mandatory and will take place under the supervision of the Western Engineering instructor to also accompany the class to KIT.

UNITS

Metric

COURSE POLICY ON THE USE OF GENERATIVE AI (GENAI)

GenAI is not required and generally not recommended for this course. Limited use is permitted only for clarity, grammar, organization, or formatting of written submissions. GenAI may not be used to generate technical analysis, engineering content, lab/field reflections or any other substantive course work expected to be completed independently by the student. Students remain fully responsible for the technical correctness, originality and safe engineering practices.

Any GenAI use must be fully disclosed, including the tool used, date(s) of use, purpose of use, and what the student verified or changed. Students who choose not to use GenAI may rely on course materials, assigned readings, and instructor support. Undisclosed or inappropriate use of GenAI, including submission of AI-generated technical work as one's own or inclusion of fabricated or unsafe content may result in academic penalties in accordance with Western Engineering policies.

General Faculty / University Policies

The Faculty of Engineering and Western University have overarching policies that prescribe how undergraduate courses should run. The course-specific policies described above should be considered in addition to those overarching policies, or as course-specific interpretations of them. In the event of contradictions or confusion between course-specific policies above and general Faculty / University policies, please contact your course instructor for clarification.

Western Engineering's undergraduate policies can be found by navigating to:
https://www.eng.uwo.ca/undergraduate/academic-support-and-accommodations/policies.html
and then clicking the "Engineering Undergraduate Policies framework" link.

The policy covers:

- Absence/Late Accommodation Policy
- Religious Accommodation
- Academic Integrity
- Academic Offences
- Faculty of Engineering AI Policy
- Accessibility