

## **MME 2200S – Engineering Shop Safety Training**

### **COURSE OUTLINE – 2024-2025**

<b>CALENDAR DESCRIPTION:</b>	This course will provide mechanical engineering undergraduate students with consistent and appropriate training in the safe use of Engineering student shops.
<b>COURSE INFORMATION:</b>	Instructor: Dr. Duane Jacques, PhD (primary contact for students) Email: <a href="mailto:djacque4@uwo.ca">djacque4@uwo.ca</a>  Course Coordinator: Dr. Ryan Willing, PhD, P.Eng Email: <a href="mailto:rwilling@uwo.ca">rwilling@uwo.ca</a>  Lectures/tutorials/labs: See <a href="#">Draft My Schedule</a>
<b>CONSULTATION HOURS:</b>	By appointment. Contact Dr. Jacques.
<b>PREREQUISITES:</b>	Entry into Year 2 of the Mechanical Engineering program.
<b>ANTIREQUISITES:</b>	MSE 2200Q/R/S/T.
<b>ACCREDITATION UNITS:</b>	Non-credit course.
<b>TOPICS:</b>	<b>Lecture 1 (January 10<sup>th</sup>) – [2hrs Mandatory Attendance]</b> <ul style="list-style-type: none"><li>• Course structure and requirements</li><li>• Introduction to Machine Tool Theory</li></ul> <b>Online Assessment: IWMSS Level-1 modules with Quizzes– Due January 12<sup>th</sup></b> <ul style="list-style-type: none"><li>• Emergency protocols</li><li>• General hazard identification: Electrical, pinching, entanglement, cutting and burning</li><li>• General identification of major considerations when cutting or working different materials:</li><li>• Tool sharpness and tools for different materials</li><li>• Cutting force and work piece fixturing</li><li>• Temperature and its effect on both cutting tool and work piece</li><li>• Cutting speed and its effects on tools and work piece</li></ul> <b>Lab Exercise 1: IWMSS Level-2 Hand on Shop Training (Week of January 13<sup>th</sup>)</b> <ul style="list-style-type: none"><li>• Theoretical Level 1 shop training concepts will be reinforced through hands-on training in the ACEB Prototyping Shop.</li><li>• Occurs during registered Lab section within week of January 13<sup>th</sup> to January 17<sup>th</sup> including online IWMSS Level-2 Follow-up Quiz.</li></ul> <b>Lecture 2 (January 17<sup>th</sup>) – [2hr Mandatory attendance] Machine tool training</b> <ul style="list-style-type: none"><li>• Cleanliness in the shops and the effects of minute particulate on machine tool fits,</li></ul>

life and work quality

- Components of a mill and lathe
- Importance of mill setup and the flexibility of a knee-type mill
- Basic theory behind the operation of mills and lathes:
  - Different chip types of various materials: discontinuous and continuous and their associated dangers
  - Cutting tool forms, angles and their resultant cuts
  - Tool holders
  - Workpiece fixturing
  - Clamping basics
  - Indicating
  - Workpiece locating: setting machining datums
  - Speeds and feeds
  - Operation sheet

**Lab Exercise 2: Advanced Machine Tool training** (January 20<sup>th</sup> through February 7<sup>th</sup>)

- Theoretical concepts emphasized in Machine Tool Theory from Lecture 1 and 2 sessions will be reinforced through hands-on exercise on conventional knee mill machine tools.

**Lecture 3 (February 7<sup>th</sup>) – [2hrs Mandatory attendance] Machine Tool Theory**

- Machine Tool Theory content is reviewed and applied in case study format to help students solidify a basic understanding of factors involved in planning setups and operations for machining prototype parts

***LEARNING  
OUTCOMES:***

The Mechanical and Materials Engineering Program has been accredited by Canadian Engineering Accreditation Board (CEAB) of Engineers Canada. Accredited programs provide the academic requirements for licensure as a professional engineer in Canada. Western Engineering has defined indicators of the 12 Graduate Attributes (GAs) that the CEAB expects graduating engineering students to demonstrate. The connections between course learning outcomes and [Western Engineering's GA Indicators](#) are identified below.

Upon successful completion of this course, students will be able to:

1. Recall emergency procedures appropriate for personal injury and fire in a shop setting (KB4)
2. Identify safety hazards present in a machine shop environment (KB4)
3. Understand and apply important concepts related to machining and working with different materials (KB4)
4. Demonstrate the safe operation of hand tools and stationary power equipment such as band saws, grinders, sanders and drill presses (ET2)
5. Understand the structural elements of conventional mill and lathe (KB4)
6. Understand the basic theory behind mill and lathe operations (KB4)
7. Understand the role of operation sheets in machining (KB4)
8. Perform simple machining operations on a knee mill (ET2)

***CONTACT HOURS:*** 1 lecture hours/week, 0.75 lab hours/week, quarter course, non-credit

***TEXTBOOK:*** None.

**UNITS:** SI will be used; however, English units may be introduced through examples as required.

**EVALUATION:** Successful completion of the course (*i.e.*, “Pass” in the academic record) is conditional on:

- Attendance at all three Lectures.
- Obtaining a minimum of 80% score on each of the three IWMSS Level-1 OWL quizzes
- Demonstrated competency and completion of IWMSS Level-2 Hands on Training (Lab Exercise 1) session.
- Obtaining a 100% score on IWMSS Level-2 Follow-up OWL Quiz.
- Demonstrated competency and completion of AMT-02 Step Block Profile Milling (Lab Exercise 2).
  - **Designated assessment - Undocumented Absence may not be used to for Academic Consideration requests towards a missed Lab Exercise 2 session.**

Lectures, online OWL modules, quizzes and laboratory sessions will be carried out according to the following schedule:

- Lecture 1 date: **Friday, January 10, 2025**
- Level-1 shop training OWL modules and Quizzes completed by: **Sunday, January 12, 2025**
- Level-2 shop training lab sessions dates\*: **Week of January 13, 2025**
- Level-2 Follow up Quiz (online) completed by: **Sunday, January 19, 2025**
- Lecture 2 date: **Friday, January 17, 2025**
- Machine Tool training lab session dates\*: **Monday, January 20, 2025 through Friday, February 7, 2025**
- Lecture 3 date: **Friday, February 7, 2025**

\* Detailed lab session schedule will be distributed through OWL in advance; each student is required attend the lab session indicated in the master schedule. Please pay close attention to the posted schedule because otherwise course mark penalties will be applied (please refer to the upcoming section on “Course Policies” for details).

**COURSE POLICIES:** The following course-specific policies will be strictly enforced throughout the course:  
**Lectures**

- Missing of any lectures without academic consideration will attract automatic course failure.
- No make-up lectures will be offered.

**Online quizzes**

- Failure to obtain *by the assigned deadline* a minimum of pass threshold on each of the course quizzes will attract automatic course failure. Required threshold values are given in *Evaluation* section above.
- Please note that quizzes can be retaken an unlimited number of times.

**Laboratory sessions**

- Failure to pass the laboratory component of the course will attract automatic course failure.
- Missing of any laboratory sessions without academic consideration will attract automatic course failure.
- If any laboratory sessions is missed with academic consideration, please contact Dr. Jacques ([djacque4@uwo.ca](mailto:djacque4@uwo.ca)) within one week after the approval of the academic consideration to schedule the make-up lab session.
- Students can only attend the laboratory session to which they were assigned. No lab session swaps are permitted without written permission from Dr. Jacques.

**General comments**

- Students who have completed in advance any course components (*i.e.*, lectures or hands-on training) are required to obtain written permissions from Dr. Jacques at least one week in advance of the scheduled course component.
- Failure to obtain advance attendance exemptions will attract automatic course failure since a certain course component will be missed without academic consideration.