



COURSE OUTLINE: MCH503 - MECHANICAL LAB I

Prepared: Kevin Sloss

Approved: Corey Meunier, Dean, Technology, Trades, and Apprenticeship

Course Code: Title	MCH503: MECHANICAL LAB 1
Program Number: Name	4043: MECH ENG. TECHNOLOGY
Department:	MECHANICAL TECHNIQUES PS
Academic Year:	2024-2025
Course Description:	The Mechanical Lab 1 course supplements and supports the Advanced Fluid Mechanics and Advanced Dynamics courses with practical learning. Lab topics in Advanced Fluid Mechanics include application of the Energy Principle, experimental determination of minor losses and losses in series/parallel pipeline systems, and pump selection. Lab topics in Dynamics include plane motion and inertial forces.
Total Credits:	2
Hours/Week:	2
Total Hours:	28
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course:	4043 - MECH ENG. TECHNOLOGY
Please refer to program web page for a complete listing of program outcomes where applicable.	VLO 1 Monitor compliance with current legislation, standards, regulations and guidelines.
	VLO 2 Plan, co-ordinate, implement and evaluate quality control and quality assurance procedures to meet organizational standards and requirements.
	VLO 3 Monitor and encourage compliance with current health and safety legislation, as well as organizational practices and procedures.
	VLO 4 Develop and apply sustainability best practices in workplaces.
	VLO 5 Use current and emerging technologies to implement mechanical engineering projects.
	VLO 6 Analyze and solve complex mechanical problems by applying mathematics and fundamentals of mechanical engineering.
	VLO 7 Prepare, analyze, evaluate and modify mechanical engineering drawings and other related technical documents.
	VLO 8 Design and analyze mechanical components, processes and systems by applying fundamentals of mechanical engineering.
	VLO 9 Design, manufacture and maintain mechanical components according to required specifications.
	VLO 10 Establish and verify the specifications of materials, processes and operations for the design and production of mechanical components.
	VLO 11 Plan, implement and evaluate projects by applying project management principles.
	VLO 12 Develop strategies for ongoing personal and professional development to enhance work performance.



Essential Employability Skills (EES) addressed in this course:

- EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
- EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.
- EES 3 Execute mathematical operations accurately.
- EES 4 Apply a systematic approach to solve problems.
- EES 5 Use a variety of thinking skills to anticipate and solve problems.
- EES 6 Locate, select, organize, and document information using appropriate technology and information systems.
- EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.
- EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.
- EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.
- EES 10 Manage the use of time and other resources to complete projects.
- EES 11 Take responsibility for ones own actions, decisions, and consequences.

Course Evaluation:

Passing Grade: 50%,

A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.

Other Course Evaluation & Assessment Requirements:

Grade

Definition Grade Point Equivalent

A+ 90 - 100% 4.00

A 80 - 89%

B 70 - 79% 3.00

C 60 - 69% 2.00

D 50 - 59% 1.00

F (Fail) 49% and below 0.00

CR (Credit) Credit for diploma requirements has been awarded.

S Satisfactory achievement in field /clinical placement or non-graded subject area.

U Unsatisfactory achievement in field/clinical placement or non-graded subject area.

X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.

NR Grade not reported to Registrar`s office.

W Student has withdrawn from the course without academic penalty.

Books and Required Resources:

Pipeflow
PipeFlow Software

Excel by Microsoft

Inventor by Autodesk



Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Compare experimental results with theoretical results for pumped fluid systems through application of the General Energy Equation.	1.1 Estimate friction losses through a pipe. 1.2 Calculate static head losses due to changes in height. 1.3 Evaluate dynamic head losses due to changes in velocity. 1.4 Compare laminar flow versus turbulent flow profiles.
Course Outcome 2	Learning Objectives for Course Outcome 2
2. Select pump and pipe sizes for specific applications.	2.1 Investigate operating characteristics of a centrifugal pump operating in series and parallel flow configurations. 2.2 Observe basic principles of cavitation and its implications on the performance of pumps.
Course Outcome 3	Learning Objectives for Course Outcome 3
3. Analyze plane motion of machine elements.	3.1 Apply the conversion of linear to angular motion and angular to linear motion. 3.2 Assemble mechanisms that combine linear and rotational motion. 3.3 Design a gear system to convert from angular to linear motion. 3.4 Create computer program(s) to calculate resultant velocity of linkages using the relative velocity and instantaneous centers methods.
Course Outcome 4	Learning Objectives for Course Outcome 4
4. Evaluate linear and angular inertia forces in mechanical systems.	4.1 Investigate frictional and other forces on a body between different surfaces using inclined planes. 4.2 Examine forces, torque, and acceleration of components of a system.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Lab Assignments (4)	100%

Date:

September 10, 2024

Addendum:

Please refer to the course outline addendum on the Learning Management System for further information.

