HUMBER

Course Outline

Course Name: Technical Mathematics 1 (TMTH 104)

Academic Period: 2021 - 2022

Faculty:

Faculty Availability:

Associate Dean:
Mona Nouroozifar
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Schedule Type Code:

Land Acknowledgement

Humber College is located within the traditional and treaty lands of the Mississaugas of the Credit. Known as Adoobiigok [A-doe-bee-goke], the "Place of the Alders" in Michi Saagiig [Mi-Chee Saw-Geeg] language, the region is uniquely situated along Humber River Watershed, which historically provided an integral connection for Anishinaabe [Ah-nish-nah-bay], Haudenosaunee [Hoeden-no-shownee], and Wendat [Wine-Dot] peoples between the Ontario Lakeshore and the Lake Simcoe/Georgian Bay regions. Now home to people of numerous nations, Adoobiigok continues to provide a vital source of interconnection for all.

Equity, Diversity and Inclusion Statement

Humber College and the University of Guelph-Humber (Humber) are leaders in providing a learning, working and living environment that recognizes and values equity, diversity and inclusion in all its programs and services. Humber commits to reflect the diversity of the communities the College serves. Students, faculty, support and administrative staff feel a sense of belonging and have opportunities to be their authentic selves.

Faculty or Department	Faculty of Liberal Arts & Sciences
Course Name:	Technical Mathematics 1 (TMTH 104)
Pre-Requisites	none
Co-Requisites	none
Equates	none
Restrictions	none
Credit Value	3
Total Course Hours	42

Developed By:	Prepared By:	Approved by:
		Mona Nouroozifar

Humber Learning Outcomes (HLOs) in this course.

The HLOs are a cross-institutional learning outcomes strategy aimed at equipping Humber graduates with the employability skills, mindsets, and values they need to succeed in the future of work. To explore all the HLOs, please consult the Humber Learning Outcomes framework.

Course Description

N/A

Course Rationale

This is the first course in Mathematics designed to provide students with basic mathematical skills that they will need in their career, including: numerical computation of basic arithmetic operations, fundamental concepts of algebra and operations, simple equations and formulas, functions and graphs, fractions and fractional equations, ratio proportion and variation, exponents and radicals, exponential and logarithmic functions, angles, right triangles, trigonometric and sinusoidal functions. By working through numerous examples and exercises that are drawn from real-world technical application, students will also develop the confidence and versatility in using mathematical tools while appreciating the relevance of these tools in allied technical fields of study.

Course Learning Method(s)

- Lecture
- Online

Learning Outcomes

- Apply basic arithmetic operations using powers, radicals, reciprocals, scientific notation, percent, and significant digits to solve technical problems.
- Perform arithmetic operations on algebraic expressions to solve linear, rational, trigonometric, logarithmic, and exponential equations.
- Express and perform computations using functional notation for polynomial, rational, radical, trigonometric, exponential, and logarithmic functions.
- Find the slope and y-intercept in order to graph and write the equation of a line.
- Use common factors, difference of two squares, and the Grouping Method to factor algebraic expressions.
- Determine quantities related by ratios and proportions, direct and inverse variation, and the power function by solving application problems.
- Use the rules of exponents and logarithms to graph and solve application problems such as growth and decay.
- Use trigonometric functions to solve right and oblique triangle application problems.
- Determine the characteristics of sine and cosine waves to graph as a function of an angle or time.
- Simplify and perform operations on exponents and radicals using the laws of exponents and radicals.

Assessment Weighting

Assessment	Weight
Instructor-Created Assessments	
Quizzes, Assignments, Live Polls, Presentations, etc.	30%
Midterm Exam	

Assessment	Weight
Mid-Term	35%
Final Exam	
Final Exam	35%
Total	**100%**

Modules of Study

Module	Course Learning Outcomes	Resources	Assessments
Numerical Computation	• Apply basic arithmetic operations using powers, radicals, reciprocals, scientific notation, percent, and significant digits to solve technical problems.	1.1 - 15, 27, 34, 40, 46, 52, 56 1.3 – 28, 30, 33, 37, 39 1.4 – 1, 8, 19, 32, 45, 47, 50, 51 1.7 – 19, 20, 23, 25, 29, 31, 37, 38, 40, 42, 46, 69	• Quizzes, Assignments, Live Polls, Presentations, etc. • Mid-Term
Introduction to Algebra	• Perform arithmetic operations on algebraic expressions to solve linear, rational, trigonometric, logarithmic, and exponential equations.	2.1 – 7, 8, 12, 25 2.2 – 9, 14, 16, 18, 19, 22 2.3 – 8, 13, 21, 29, 36, 44, 48 2.4 – 3, 7, 8, 13, 17, 23, 27, 31, 35, 38, 44, 51, 54, 61, 66 2.5 – 2, 6, 8, 10, 12, 13, 18, 23	• Quizzes, Assignments, Live Polls, Presentations, etc. • Mid-Term
Simple Equations and Word Problems	• Perform arithmetic operations on algebraic expressions to solve linear, rational, trigonometric, logarithmic, and exponential equations.	3.1 - 1, 5, 15, 25, 27, 31, 37, 38, 41, 45, 47, 49	• Quizzes, Assignments, Live Polls, Presentations, etc. • Mid-Term
Functions	• Express and perform computations using functional notation for polynomial, rational, radical, trigonometric, exponential, and logarithmic functions.	4.2 - 1, 3, 5, 7, 9, 11, 13, 19, 21, 24, 26	• Quizzes, Assignments, Live Polls, Presentations, etc. • Mid-Term

Module	Course Learning Outcomes	Resources	Assessments
Graphs	• Find the slope and y-intercept in order to graph and write the equation of a line.	5.1 - 1, 3, 5, 7, 9, 11, 13, 18 5.3 - 1, 4, 8, 9, 10, 12	• Quizzes, Assignments, Live Polls, Presentations, etc. • Mid-Term
Factors and Factoring	• Use common factors, difference of two squares, and the Grouping Method to factor algebraic expressions.	8.1 - 1, 3, 5, 7 8.2 - 2, 3, 4, 5, 7, 9 8.3 – 7, 9, 11, 13, 15 8.4 – 1, 3, 5, 7, 9, 11 8.5 – 1, 3, 5, 7, 9, 11, 13, 15	• Quizzes, Assignments, Live Polls, Presentations, etc. • Mid-Term • Final Exam
Fractions and Fractional Equations	• Perform arithmetic operations on algebraic expressions to solve linear, rational, trigonometric, logarithmic, and exponential equations.	9.1 – 1, 3, 5, 19, 21, 29, 31, 33, 37, 38 9.2 – 3, 7, 13, 15, 27, 31, 37, 38 9.3 – 3, 9, 13, 21, 27, 29 9.5 – 1, 4, 5, 6, 8, 9	• Quizzes, Assignments, Live Polls, Presentations, etc. • Mid-Term • Final Exam
Ratio, Proportion, and Variation	• Determine quantities related by ratios and proportions, direct and inverse variation, and the power function by solving application problems.	19.1 – 1, 3, 5, 11, 13, 19, 21, 23 19.2 – 1, 3, 5, 9 19.3 – 1, 3, 5, 7, 9 19.4 – 1, 3, 5, 7, 8 19.5 – 1, 3, 5, 7	• Quizzes, Assignments, Live Polls, Presentations, etc. • Mid-Term • Final Exam
Exponents and Radicals	• Simplify and perform operations on exponents and radicals using the laws of exponents and radicals.	13.1 – 1, 7, 15, 31, 39, 41, 45, 46 13.2 – 1, 3, 7, 9, 15, 17, 25, 31, 33, 39 13.3 – 1, 3, 5, 13, 17, 20	• Quizzes, Assignments, Live Polls, Presentations, etc. • Final Exam
Exponential and Logarithmic Functions	• Use the rules of exponents and logarithms to graph and solve application problems such as growth and decay.	20.1 – 1, 2, 3, 4 20.2 – 3, 5, 7, 9, 15, 16 20.3 – 1, 3, 5, 7, 8, 9, 13, 15, 17, 18 20.4 – 1, 7, 9, 11, 16, 17, 20 20.5 – 1, 3, 8, 9, 15, 16, 17 20.6 – 1, 3, 5, 11, 16, 20, 28, 29, 31	• Quizzes, Assignments, Live Polls, Presentations, etc. • Final Exam

Module	Course Learning Outcomes	Resources	Assessments
Right and Oblique Triangles, and Vectors	• Use trigonometric functions to solve right and oblique triangle application problems.	7.1 – 1, 2, 13, 14 7.2 – 9, 11, 17, 19, 23, 29, 33, 35 7.3 – 1, 4, 7, 8, 9, 10, 11, 13 7.4 – 1, 3, 7, 9, 11, 13, 15 15.1 – 1, 5, 9, 17, 22, 24, 30, 35, 38, 39, 43, 44, 48, 50, 51	• Quizzes, Assignments, Live Polls, Presentations, etc. • Final Exam
Graphs of the Trigonometric Functions	• Determine the characteristics of sine and cosine waves to graph as a function of an angle or time.	17.1 – 1, 3, 5, 7 17.2 – 1, 3, 5, 9, 11, 12, 15, 17, 18 17.4 – 1, 3, 5, 9 17.5 – 3, 5, 7, 9, 11, 13, 17, 18, 19, 31, 33	• Quizzes, Assignments, Live Polls, Presentations, etc. • Final Exam

Required Resources

Calter M., Calter P., Wraight P., and White S. (2016). *Technical Mathematics with Calculus, 3rd Canadian Edition.* Toronto: Wiley.

Additional Tools and Equipment

- Scientific Calculator: CASIO-FX991 ES

Essential Skills

Section	Skills	Measurement	Details
Communication	• Reading • Writing • Speaking • Listening • Presenting	Teach and measure	• Written assessments and problem-based learning • Student response software and assessments.
Numeracy	• Understanding and applying mathematical concepts and reasoning • Analyzing and using numerical data • Conceptualizing	Teach and measure	• Written assessments and problem-based learning. • Student response software and assessments.

Section	Skills	Measurement	Details
Critical Thinking and Problem-Solving	• Analysing • Synthesizing • Evaluating	Teach and measure	• Written assessments and problem-based learning. • Student response software and assessments.

Prior Learning Assessment & Recognition (PLAR)

Prior Learning Assessment and Recognition (PLAR) is the formal evaluation and credit-granting process whereby candidates may obtain credits for prior learning. Prior learning includes the knowledge competencies and skills acquired, in both formal and informal ways, outside of post-secondary education. Candidates may have their knowledge, skills and competencies evaluated against the learning outcomes as defined in the course outline. Please review the Assessment Methods Glossary for more information on the Learning Portfolio assessment methods identified below.

The method(s) that are used to assess prior learning for this course may include:

- Challenge Exam (results recorded as a % grade and added to student's CGPA)

Please contact the Program Coordinator for more details.

Academic Regulations

It is the student's responsibility to be aware of the College Academic Regulations. The Academic Regulations apply to all applicants to Humber and all current students enrolled in any program or course offered by Humber, in any location. Information about academic appeals is found in the **Academic Regulations**.

Anti-Discrimination Statement

At Humber College, all forms of discrimination and harassment are prohibited. Students and employees have the right to study, live and work in an environment that is free from discrimination and harassment. If you need assistance on concerns related to discrimination and harassment, please contact the Centre for Human Rights, Equity and Inclusion or the Office of Student Conduct.

Accessible Learning Services

Humber strives to create a welcoming environment for all students where equity, diversity and inclusion are paramount. Accessible Learning Services facilitates equal access for students with disabilities by coordinating academic accommodations and services. Staff in Accessible Learning Services are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. If you require academic accommodations, contact:

Accessible Learning Services

North Campus: (416) 675-6622 X5090

Lakeshore Campus: (416) 675-6622 X3331

Academic Integrity

Academic integrity is essentially honesty in all academic endeavors. Academic integrity requires that students avoid all forms of academic misconduct or dishonesty, including plagiarism, cheating on tests or exams or any misrepresentation of academic accomplishment.

Disclaimer

While every effort is made by the professor/faculty to cover all material listed in the outline, the order, content, and/or evaluation may change in the event of special circumstances (e.g. time constraints due to inclement weather, sickness, college closure, technology/equipment problems or changes, etc.). In any such case, students will be given appropriate notification in

writing, with approval from the Dean (or designate) of the School.

Given the circumstances due to COVID-19, Humber reserves the right to alter the mode of delivery and examinations/assessments in this course.

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