DURHAM COLLEGE
SUCCESS MATTERS

Sch of Science & Engineer Tech

Mathematics for Technology I

2017-18 Academic Year

Program	Year	Semester
SET-Architectural Technician Diploma	1	1
SET-Architectural Technology Advanced Diploma	1	1
SET-Biomedical Engineering Technology Advanced Diploma	1	1
SET-Chemical Engineering Technology Advanced Diploma	1	1
SET-Mechanical Engineering Technician Diploma	1	1
SET-Mechanical Engineering Technician Non Destructive Evaluation Diploma	1	1
SET-Mechanical Engineering Technology Advanced Diploma	1	1

Course Code:	MATH 1131	**Course Equiv. Code(s):**	MATH 1317, TFMA 1305, MATH 1109, MATH 1133, MATH 1135, MATH 1150, MATH 1181
Course Hours:	56	**Course GPA Weighting:**	4
Prerequisite:	N/A		
Corequisite:	N/A		
Laptop Course:	**Yes** [ ] **No** [X]		
Delivery Mode(s):	**In class** [X] **Online** [ ] **Hybrid** [ ] **Correspondence** [ ]		
Authorized by (Dean or Director):	Susan Todd	**Date:**	July 2017

Prepared by		
First Name	**Last Name**	**Email**
Clair	Sigus	clair.sigus@durhamcollege.ca
Michelle	Lagerwey	michelle.lagerwey@durhamcollege.ca
Wendy	Bracken	wendy.bracken@durhamcollege.ca
Deanna	Williams	deanna.williams@durhamcollege.ca

Course Description:

The purpose of this course is to refresh and upgrade existing mathematical skills such as algebra, geometry, trigonometry, and more. Emphasis is placed on developing problem solving techniques by applying these math topics to related engineering problems. It is configured as four one hour classes per week.

Subject Eligibility for Prior Learning Assessment & Recognition (PLAR):

Prior Learning Assessment and Recognition (PLAR) is a process a student can use to gain college credit(s) for learning and skills acquired through previous life and work experiences. Candidates who successfully meet the course learning outcomes of a specific course may be granted credit based on the successful assessment of their prior learning. The type of assessment method (s) used will be determined by subject matter experts. Grades received for the PLAR challenge will be included in the calculation of a student's grade point average.

The PLAR application process is outlined in http://www.durhamcollege.ca/plar. Full-time and part-time students must adhere to all deadline dates. Please email: PLAR@durhamcollege.ca for details.

PLAR Eligibility

Yes [X] **No** [ ]

PLAR Assessment (if eligible):

- [ ] Assignment
- [X] Exam
- [ ] Portfolio
- [ ] Other

Course Learning Outcomes

Course Learning Outcomes contribute to the achievement of Program Learning Outcomes for courses that lead to a credential (e.g. diploma). A complete list of Vocational/Program Learning Outcomes and Essential Employability Skill Outcomes are located in each Program Guide.

Course Specific Learning Outcomes (CLO)

Student receiving a credit for this course will have reliably demonstrated their ability to:

CLO1 Perform arithmetic operations on numbers in decimal, scientific, and engineering notation.

CLO2 Use algebraic manipulation to solve equations and formulae for both literal and numerical answers.

CLO3 Convert units within and between Metric and Imperial systems of units.

CLO4 Manually graph a function.

CLO5 Identify basic principles of geometry and compute lengths, areas, and volumes of various geometric figures and solids.

CLO6 Find the missing sides or angles of a triangle.

CLO7 Solve practical problems involving triangles.

CLO8 Resolve a vector into components and conversely, combine components into a resultant vector for practical applications.

CLO9 Factor algebraic expressions and use factoring techniques in applications.

CLO10 Solve quadratic equations.

CLO11 Interpret and apply foundational statistical analysis techniques to data sets.

Essential Employability Skill Outcomes (ESSO)

This course will contribute to the achievement of the following Essential Employability Skills:

- [ ] 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.
- [X] EES 3. Execute mathematical operations accurately.
- [X] 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 contribution of others.
- [ ] EES 9. Interact with others in groups or teams in ways 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 one's own actions, decisions, and consequences.

Evaluation Criteria:

The Course Learning Outcomes and Essential Employability Skills Outcomes are evaluated by the following evaluation criterion.

Evaluation Description	Course Learning Outcomes	EESOs	Weighting
Quizzes and Homework (equally weighted)	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11	EES3	35
Tests (2@ 17.5%)	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO10	EES3, EES4	35
Final Examination	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7, CLO8, CLO9, CLO10, CLO11	EES3	30
Total			**100%**

Notes:

1. An interim marks will be determined for all students to identify their academic progress. This mark will be based on the results of the in process grade up to the mid-term date.
2. In circumstances where a student has been (or anticipates being) absent from a lecture due to illness or injury they may request special consideration.
3. For academic consideration, appropriate verifiable documentation must be presented to the student advisor (Room H140) and dated within 5 calendar days of your return to school.
4. There will be a minimum of eight (8) quizzes or homework assignments (equally weighted) with the lowest mark being dropped.
5. Quizzes may be comprised of: definition, multiple choice, problem solving, skill testing, and diagram and/or graph drawing & labelling questions. The quiz can be OPEN notebook or textbook or the professor may provide necessary formulas on the blackboard, screen or on paper.
6. There will be no make-up quizzes. A missed quizz or assignment will be attributed a zero "0" grade. The weighting for a missed quiz or assignment with substantive reason i.e. medical or compassionate will be redistributed over the category of Quizzes and Homework.
7. Although homework questions from the textbook or Wiley+ will be assigned on a regular basis throughout the semester, only some of the homework will be collected for marking.
8. Tests will be CLOSED book and scheduled during a class time. Test questions may be comprised of: definition, multiple choice, problem solving, skill testing, and diagram and/or graph drawing. One double sided hand written A4 crib sheet is allowed.
9. The Final Exam will consist of questions similar to those in homework, tests, and quizzes. One double sided hand written A4 double sided crib sheet (no electronic reproductions) will be permitted.
10. The calculator is permitted to aid you in solving math problems and in checking the accuracy of your answer; however, it is expected that you will show how you arrived at your answer. Emphasis will be placed on good documentation skills, labelling and consistent and thorough problem solving techniques.
11. Students who unavoidably miss a class where a test, quiz or other form of evaluation occurs, must notify the professor via email prior to the scheduled class time where possible or within 24 hours of the missed class. If this is not possible students must connect with their professor or student advisor immediately upon their return to school.
12. A missed test with appropriate documentation are rescheduled or a grade of zero will be entered.

Required Text(s) and Supplies:

1. Calter, Paul A, and Michael A. Calter.Technical Mathematics With Calculus with WileyPLUS LMS Card, Third Canadian Edition. J.Wiley and Sons Inc. ISBN 9781119422860

2. Technical Mathematics With Calculus, Third Canadian Edition. WileyPLUS LMS Card ISBN 9781119322290

3. Casio 991ES or Casio ES Plus C Scientific Calculator

Recommended Resources (purchase is optional):

1. MATH1131 Formula Sheet will be posted at DC Connect

Policies and Expectations for the Learning Environment:

General Policies and Expectations:

General College policies related to	General policies related to
+ Acceptable Use of Information Technology	+ attendance
+ Academic Policies	+ absence related to tests or assignment due dates
+ Academic Honesty	+ excused absences
+ Student Code of Conduct	+ writing tests and assignments
+ Students' Rights and Responsibilities can be found on-line at http://www.durhamcollege.ca/academicpolicies	+ classroom management can be found in the Program Guide (full time programs only) in MyCampus http://www.durhamcollege.ca/mycampus/

Course Specific Policies and Expectations:

1. Students are expected to attend all classes and keep up to date notes. Go over the lecture material and get help and clarification on material you do not understand by asking the professor, going to SALS, working with your peers and/or using additional resources.
2. Students are expected to keep up to date assignment, quiz, and test dates and any course information through DC Connect.
3. The use of a mobile device or a laptop as a calculator is NOT permitted during quizzes, tests, and the exam. Students are strongly encouraged to use the required calculator in this course. Only the required calculator will be used by the instructor in lectures and for demonstrations.
4. There is no sharing of supplies during tests including calculators, pencils and pens, erasers and rulers. If not complied a student will receive a grade of zero and an academic alert.
5. There is no talking during testing; any communication will be done through the professor. If not complied a student will receive a grade of zero and an academic alert.
6. Quizzes, assignments and tests are to be completed individually. If it is determined that a student has shared or copied any portion, all students involved will receive a mark of zero and an academic alert. Refer to the program guide and college academic policies and procedures for definitions and penalties regarding this policy.
7. This course qualifies for the Missed Final Examination Policy for week 15 only.

General Course Outline Notes:

1. Students should use the course outline as a learning tool to guide their achievement of the learning outcomes for this course. Specific questions should be directed to their individual professor.
2. The college considers the electronic communication methods (i.e. DC Mail or DC Connect) as the primary channel of communication. Students should check the sources regularly for current course information.
3. Professors are responsible for following this outline and facilitating the learning as detailed in this outline.
4. Course outlines should be retained for future needs (i.e. university credits, transfer of credits etc.)
5. A full description of the Academic Appeals Process can be found at http://durhamcollege.ca/gradeappeal.
6. Faculty are committed to ensuring accessible learning for all students. Students who would like assistance with academic access and accommodations in accordance with the Ontario Human Rights Code should register with the Access and Support Centre (ASC). ASC is located in room SW116, Oshawa Campus and in room 180 at the Whitby Campus. Contact ASC at 905-721-3123 for more information.
7. Durham College is committed to the fundamental values of preserving academic integrity. Durham College and faculty members reserve the right to use electronic means to detect and help prevent plagiarism. Students agree that by taking this course all assignments could be subject to submission either by themselves or by the faculty member for a review of textual similarity to Turnitin.com. Further information about Turnitin can be found on the Turnitin.com Web site.

Learning Plan

The Learning Plan is a planning guideline. Actual delivery of content may vary with circumstances.

Students will be notified in writing of changes that involve the addition or deletion of learning outcomes or evaluations, prior to changes being implemented, as specified in the Course Outline Policy and Procedure at Durham College.

Wk.	Hours: 4 Delivery: In Class	
1	**Intended Learning Objectives** Introduction	
	Intended Learning Activities Review Diagnostic testing	
	Resources and References Chapter 1.1- 1.3	
	Evaluation Quizzes and Homework (9 minimum, ongoing)	**Weighting** 35% - ongoing
Wk.	**Hours:** 4 **Delivery:** In Class	
2	**Intended Learning Objectives** Unit 1 - Measurement 1.1 Recognize and use the units of measure for the basic physical parameters. 1.2 Use the principles of Dimensional Analysis to convert between the SI and Imperial systems of units. 1.3 Convert numbers between decimal, scientific, and engineering notation 1.4 Apply concepts of approximation and significant digits to express results accurately and precisely	
	Intended Learning Activities Lecture Formative assessment	
	Resources and References Chapter 1.4-1.7	
	Evaluation	

Wk.	Hours: 4 Delivery: In Class
3	**Intended Learning Objectives** Unit 2 - Trigonometry and Vectors 2.1 Find the trigonometric functions of an angle 2.2 Find the acute angle that has a given trigonometric function 2.3 Determine the missing sides and angles of a right triangle 2.4 Solve practical problems involving the right triangle 2.5 Perform vector addition. 2.6 Resolve vectors into components 2.7 Solve practical problems by adding or subtracting vectors
	Intended Learning Activities Lecture Formative assessment
	Resources and References Chapter 7.1-7.5
	Evaluation
Wk.	**Hours:** 4 **Delivery:** In Class
4	**Intended Learning Objectives** Unit 2 - Trigonometry and Vectors (cont'd) 2.1 Find the trigonometric functions of an angle 2.2 Find the acute angle that has a given trigonometric function 2.3 Determine the missing sides and angles of a right triangle 2.4 Solve practical problems involving the right triangle 2.5 Perform vector addition 2.6 Resolve vectors into components 2.7 Solve practical problems by adding or subtracting vectors
	Intended Learning Activities Lecture Formative assessment
	Resources and References Chapter 7.6-7.7
	Evaluation

Wk.	Hours: 4 Delivery: In Class
5	**Intended Learning Objectives** Unit 3- Algebra 3.1 Define common algebraic terms: variable, expression, term, polynomial and so forth 3.2 Simplify an expression by removing symbols of grouping 3.3 Use the laws of exponents for multiplication, division, and raising to a power 3.4 Solve first degree equations 3.5 Solve quadratic equations by formula
	Intended Learning Activities Lecture Formative assessment
	Resources and References Chapter 2.1-2.5 Chapter 3.1 Chapter 14.3
	Evaluation

Wk.	Hours: 4 Delivery: In Class	
6	**Intended Learning Objectives** Unit 4 - Functions and Graphs 4.1 Use functional notation to manipulate and evaluate functions 4.2 Graph points and empirical data in rectangular coordinates 4.3 Make a complete graph of a function 4.4 Solve equations graphically 4.5 Use the table function on the calculator to generate a table of values	
	Intended Learning Activities Lecture Summative assessment	
	Resources and References Chapter 4.1, 4.2 Chapter 5.1-5.5 Chapter 14.5, 14.7	
	Evaluation	**Weighting**
	Test #1 (UNIT 1, 2, 3)	17.5 %

Wk.	Hours: 4 Delivery: In Class
7	**Intended Learning Objectives** Unit 4 - Functions and Graphs 4.1 Use functional notation to manipulate and evaluate functions 4.2 Graph points and empirical data in rectangular coordinates 4.3 Make a complete graph of a function 4.4 Solve equations graphically 4.5 Use the table function on the calculator to generate a table of values
	Intended Learning Activities Lecture Formative assessment
	Resources and References Chapter 4.1, 4.2 Chapter 5.1-5.5 Chapter 14.5, 14.7
	Evaluation
Wk.	**Hours:** 4 **Delivery:** In Class
8	**Intended Learning Objectives** Unit 5 - Geometry 5.1 Find the angles formed by intersecting lines 5.2 Solve practical problems in which the area of a triangle or of a quadrilateral must be found 5.3 Solve application problems involving the circumference, diameter, and area of a circle 5.4 Compute surface areas and volumes of spheres, cylinders, cones, and other solid figures
	Intended Learning Activities Lecture Formative assessment
	Resources and References Chapter 6.1- 6.6
	Evaluation

Wk.	Hours: 4	Delivery: In Class
9	**Intended Learning Objectives** Unit 5 - Geometry (cont'd) 5.1 Find the angles formed by intersecting lines 5.2 Solve practical problems in which the area of a triangle or of a quadrilateral must be found 5.3 Solve application problems involving the circumference, diameter, and area of a circle 5.4 Compute surface areas and volumes of spheres, cylinders, cones, and other solid figures	
	Intended Learning Activities Lecture Formative assessment	
	Resources and References Chapter 6.1-6.6	
	Evaluation	
Wk.	**Hours:** 4	**Delivery:** In Class
10	**Intended Learning Objectives** Unit 6 - Oblique Triangles 6.1 Convert angular measurements between degrees and radians. 6.2. Apply Cos and Sine laws to determine unknown values of non-right triangles 6.3 Oblique triangles and non-perpendicular vectors	
	Intended Learning Activities Lecture Formative assessment	
	Resources and References Chapter 15.1-15.5 Chapter 16.1	
	Evaluation	
Wk.	**Hours:** 4	**Delivery:** In Class
11	**Intended Learning Objectives** Unit 6 - Oblique Triangles (cont'd) 6.1 Convert angular measurements between degrees and radians. 6.2. Apply Cos and Sine laws to determine unknown values of non -right triangles 6.3 Oblique triangles and non-perpendicular vectors	
	Intended Learning Activities Lecture Summative assessment	
	Resources and References Chapter 15.1-15.5 Chapter 16.1	
	Evaluation Test#2 (UNIT 4, 5, 6)	**Weighting** 17.5 %

Wk.	Hours: 4 Delivery: In Class
12	**Intended Learning Objectives** Unit 7 - Factors and Fractions (cont'd) 7.1 Factor expressions by removing common factors 7.2 Factor expressions by sum or difference of squares / cubes 7.3 Factor expressions by grouping 7.4 Use factoring techniques in applications 7.5 Simplify algebraic fractions 7.6 Add, subtract, and divide algebraic fractions 7.7 Simplify complex fractions 7.8 Solve literal equations and formulas involving fractions
	Intended Learning Activities Lecture Formative assessment
	Resources and References Chapter 8.1-8.7 Chapter 9.1-9.5, 9.7,14.1
	Evaluation

Wk.	Hours: 4 Delivery: In Class
13	**Intended Learning Objectives** Unit 7 - Factors and Fractions (cont'd) 7.1 Factor expressions by removing common factors 7.2 Factor expressions by sum or difference of squares / cubes 7.3 Factor expressions by grouping 7.4 Use factoring techniques in applications 7.5 Simplify algebraic fractions 7.6 Add, subtract, and divide algebraic fractions 7.7 Simplify complex fractions 7.8 Solve literal equations and formulas involving fractions
	Intended Learning Activities Lecture Formative assessment
	Resources and References Chapter 8.1-8.7 Chapter 9.1-9.5, 9.7,14.1
	Evaluation

Wk.	Hours: 4	Delivery: In Class
14	**Intended Learning Objectives** UNIT 8 - Introduction to Statistics 8.1 Identify data by type 8.2 Use plots, graphs and charts to represent data 8.3 Organize data into frequency distributions, histograms and polygons and make cumulative frequency distributions 8.4 Calculate measures of central tendency and measures of dispersion including variance and standard deviation	
	Intended Learning Activities Lecture Practice	
	Resources and References Chapter 26.1-26.3	
	Evaluation	
Wk.	**Hours:** 2	**Delivery:** Final Exam
15	**Intended Learning Objectives** Final Examination	
	Intended Learning Activities N/A	
	Resources and References N/A	
	Evaluation Final Examination	**Weighting** 30%