CAMOSUN COLLEGE
School of Arts & Science
Department of Mathematics & Statistics

MATH-097-D01
College Prep – Mathematics 2
Winter 2021

COURSE OUTLINE

The course description is online @ http://camosun.ca/learn/calendar/current/web/math.html

Ω *Please note: This outline will <u>not</u> be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.*

1. Instructor Information

(a)	**Instructor**	Chedo Barone
(b)	**Office hours**	Tues, Thur, Fri 11:30 – 12:20, Wed 2:30 – 3:20, or by appointment. Held on Blackboard Collaborate; link is posted on D2L
(c)	**Location**	Online
(d)	**Phone**	**Alternative:**
(e)	**E-mail**	baronec@camosun.ca
(f)	**Website**	D2L (login at online.camosun.ca)

2. Intended Learning Outcomes

The learning outcomes in this course meet the required learning outcomes in ABE Mathematics: Provincial Algebra and Trigonometry outlined in the BC ABE Articulation Handbook 2019/20 Edition. Upon successful completion of this course a student will be able to:

1. Employ advanced graphing techniques for relations and functions, including discontinuous applications. In particular, students will be able to:
    a. Find the distance between two points in the plane and find the midpoint of a segment,
    b. Apply the distance formula and midpoint formula to solve problems,
    c. Recognize graphs of common functions: linear, constant, quadratic, cubic, square root, absolute value, reciprocal,
    d. Use the vertical line test to identify functions,
    e. Graph functions and analyze graphs of functions, identifying: domain and range; intervals on which the function is increasing, decreasing or constant,
    f. Write formulas of functions to model real life applications,
    g. Determine whether a graph is symmetric with respect to the x-axis, y-axis, and the origin,
    h. Identify even or odd functions and recognize their symmetries,
    i. Graph transformations of functions: translations, reflections, stretchings and shrinkings,
    j. Graph functions defined piecewise,
    k. Find the sum, difference, product and quotient of two functions and determine their domains,
    l. Find the composition of two functions *f* and *g,* finding formulas for *f(g(x))* and *g(f(x)),* identifying the domain of the composition and evaluating the composite functions,
    m. Given an equation defining a relation, write an equation of the inverse relation,

n. Given a graph of a relation or function, sketch a graph of its inverse,
o. Use the horizontal line test to determine if a function is one-to-one and therefore has an inverse that is a function,
p. Find a formula for the inverse of a function, and
q. Find $f{-1}f(x))$ and $f(f{-1}(x))$ for an number x in the domains of the functions when the inverse of a function is also a function.

2. Apply the algebraic and visual properties of polynomial and rational functions to modelling of continuous and discontinuous phenomena. In particular, students will be able to:
   a. Graph quadratic functions and analyze graphs of quadratic functions identifying the vertex, line of symmetry, maximum/minimum values, and intercepts,
   b. Solve applied problems involving maximum and minimum function values,
   c. Determine the behavior of the graphs of polynomial functions of higher degree using the leading coefficient test,
   d. Determine whether a function has a real zero between two real numbers,
   e. Recognize characteristics of the graphs of polynomial functions including real zeros, y-intercept, relative maxima and minima, domain and range,
   f. Divide polynomials using long division,
   g. Use synthetic division to divide a polynomial by x-r,
   h. Use the remainder and factor theorems to find function values and factors of a polynomial,
   i. List the possible rational zeros for a polynomial function with integer coefficients,
   j. Factor polynomial functions and find the zeros,
   k. Find a polynomial with specified zeros, and
   l. Solve polynomial and rational inequalities.

3. Apply the fundamental algebraic and visual properties of exponential and logarithmic functions to simple examples. In particular, students will be able to:
   a. Evaluate exponential functions including functions with base e,
   b. Recognize the inverse relationship between exponential and logarithmic equations,
   c. Graph exponential and logarithmic functions including transformations and analyze the graphs in terms of: x- or y- intercepts, asymptotes, increasing or decreasing, domain and range,
   d. Convert between exponential and logarithmic equations
   e. Find common and natural logarithms using a calculator
   f. Use basic and inverse properties of logarithms: $\log_b b=1$, $\log_b 1=0$, $\log_b b^x=b$, $b^{\log_b x}=x$,
   g. Use the product rule, quotient rule and power rule to expand or condense logarithmic expressions,
   h. Use the change of base property to find a logarithm with base other than 10 or e,
   i. Solve exponential and logarithmic equations, and
   j. Use exponential and logarithmic equations to model and solve real-life applications including exponential growth and decay.

4. Apply the fundamental algebraic and visual properties of trigonometric functions to simple examples of periodic phenomena. In particular, students will be able to:
   a. Identify angles in standard position, positive and negative angles, coterminal angles and reference angles,
   b. Convert between degree and radian measures of angles,
   c. Find the length of an arc, radian measure of central angle, or radius of a circle using the formula $s=r\theta$,
   d. Identify special angles on a unit circle,
   e. Determine the six trigonometric functions of an angle in standard position given a point on its terminal side,
   f. Find the exact values of the trigonometric functions of special acute angles 30° (π/6), 45° (π/4), and 60° (π/3) or any angles that are multiples of these special angles,
   g. Graph the six trigonometric functions and state their properties,
   h. Graph transformations of the sine and cosine functions and determine period, amplitude, and phase shift,
   i. Recognize and use the reciprocal, quotient and Pythagorean identities,

j. Apply the sum or difference formulas and double angle formulas to find exact values and to verify trigonometric identities,
k. Recognize and use inverse trigonometric function notation,
l. Use a calculator to evaluate inverse trigonometric functions,
m. Find exact values of composite functions with inverse trigonometric functions,
n. Solve trigonometric equations over the interval $(0, 2\pi)$, and
o. Use trigonometric functions to model and solve real-life problems.

5. Apply the fundamental algebraic properties of sequences and series to describe geometric growth patterns. In particular, students will be able to:
a. Find terms of sequences given the general or n_{th} term,
b. Find a formula for the general or n_{th} term of a given sequence,
c. Use summation notation to write a series and evaluate a series designated in summation notation,
d. Construct the terms of a sequence defined by a recursive formula,
e. Recognize and write terms of arithmetic and geometric sequences,
f. Use n_{th} term formulas for arithmetic and geometric sequences to find a specified term, or to find n when an n_{th} term is given,
g. Find the sum of the first n terms of arithmetic and geometric sequences,
h. Find the sum of an infinite geometric series, if it exists, and
i. Use sequences and series to model and solve real-life problems.

3. Required Materials

(a) Texts

Algebra and Trigonometry, Jay Abramson (senior author), OpenStax: Texas. The textbook can be downloaded at this link: https://openstax.org/details/books/algebra-and-trigonometry

(b) Other

The Sharp-EL 531 is the model I will be using and demonstrating. An "online" version is available for download at http://www.sharp-calculators.com/en/content/id/121-learning-materials

4. Course Content and Schedule

Content: We will cover Chapters 1,2,3,5,6,7,8,9, and 13.

Overall Course Structure: At the start of each week, approximately 2.5 hours of videos will be posted on D2L. During the first class of the week (***Tutorial***), we will work together on questions relating to the previous week's videos. During the second class of the week (***Check-In***), I will present a recap of the current week's video lectures.

Tutorials will typically run for 1.5 hours, and the Check-Ins will typically run for 1 hour.

Quizzes: After the Check-In we will typically have a short quiz (20 minutes writing time). See the Math 097 Schedule, posted on D2L for the dates of these quizzes. The quizzes will typically consist of 3 to 4 questions from the previous week's course content.

Tests: There will be three term tests, each with a writing time of one hour. The coverage for each test will be announced during the Check-In on the previous week.

Final Exam: There will be a comprehensive three-hour final exam scheduled during the Final Exam Period (April 19 – 27)

5. Basis of Student Assessment (Weighting)

Assignments: Intro assignment (worth 1%)

Quizzes: There are 7 quizzes in total, and I will drop the lowest quiz mark for each student. The remaining quizzes will each be worth 4%, for a total of 24%

Tests: 3 term tests, each worth 15%, for a total of 45%

Final Exam: 30%

Please see the Math 097 Schedule, posted on D2L, for the dates of quizzes and tests. The final exam date will fall during the Final Exam Period (April 19 – 27)

6. Grading System

| X | Standard Grading System (GPA) |

| | Competency Based Grading System |

7. Recommended Materials to Assist Students to Succeed Throughout the Course

Math Lab (Help Centre)

Math lab is staffed with instructional assistants available for **free** help. Please email themathlabs@gmail.com to arrange an appointment. Lab hours can be viewed at http://camosun.ca/services/help-centres/

8. College Supports, Services and Policies

Immediate, Urgent, or Emergency Support
If you or someone you know requires immediate, urgent, or emergency support (e.g. illness, injury, thoughts of suicide, sexual assault, etc.), **SEEK HELP**. Resource contacts @ http://camosun.ca/about/mental-health/emergency.html or http://camosun.ca/services/sexual-violence/get-support.html#urgent

College Services
Camosun offers a variety of health and academic support services, including counselling, dental, disability resource centre, help centre, learning skills, sexual violence support & education, library, and writing centre. For more information on each of these services, visit the **STUDENT SERVICES** link on the College website at http://camosun.ca/

College Policies

Camosun strives to provide clear, transparent, and easily accessible policies that exemplify the college's commitment to life-changing learning. It is the student's responsibility to become familiar with the content of College policies. Policies are available on the College website at http://camosun.ca/about/policies/. Education and academic policies include, but are not limited to, Academic Progress, Admission, Course Withdrawals, Standards for Awarding Credentials, Involuntary Health and Safety Leave of Absence, Prior Learning Assessment, Medical/Compassionate Withdrawal, Sexual Violence and Misconduct, Student Ancillary Fees, Student Appeals, Student Conduct, and Student Penalties and Fines.

A. GRADING SYSTEMS *http://camosun.ca/about/policies/index.html*

The following two grading systems are used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0

2. Competency Based Grading System (Non GPA)

This grading system is based on satisfactory acquisition of defined skills or successful completion of the course learning outcomes

Grade	Description
COM	The student has met the goals, criteria, or competencies established for this course, practicum or field placement.
DST	The student has met and exceeded, above and beyond expectation, the goals, criteria, or competencies established for this course, practicum or field placement.
NC	The student has not met the goals, criteria or competencies established for this course, practicum or field placement.

B. Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at http://camosun.ca/about/policies/index.html for information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description

I	*Incomplete*: A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
IP	*In progress*: A temporary grade assigned for courses that are designed to have an anticipated enrollment that extends beyond one term. No more than two IP grades will be assigned for the same course.
CW	*Compulsory Withdrawal*: A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.