		School of Arts & Science **MATHEMATICS DEPARTMENT** **MATH 107 Section 001** **Applied Precalculus** **Spring 2016**

COURSE OUTLINE

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

1. Instructor Information

(a)	Instructor:	Fan Wu	
(b)	Office Hours:	Tuesday, Thursday 05:00PM - 06:00PM	
(c)	Location:	E254	
(d)	Phone:	250-370-3471	Alternative Phone:
(e)	Email:	wuf@camosun.bc.ca	
(f)	Website:	D2L	

2. Intended Learning Outcomes

Upon completion of this course the student will be able to:

1. Read and write mathematics at a level sufficient for entry into applied calculus.
2. Factor polynomials. Simplify rational expressions, complex fractions and radicals. Factor and simplify expressions containing rational exponents.
3. Choose efficient strategies to solve quadratic equations. Solve radical equations and equations involving rational expressions.
4. State the formulas for the slope y-intercept and point slope form of lines and use the formulas to find equations of lines. Graph linear equations and find equations from graphs. Model real-life problems with linear equations.
5. Write the equations of circles and ellipses in standard form and graph these relations.
6. Define the term function. Determine if relations are functions. Find the domains of functions. Define even and odd functions and test functions to determine if they are even, odd or neither. Form and simplify difference quotients and explain their graphical interpretation and significance.
7. Identify the graphs of common algebraic functions. Evaluate and graph piecewise defined functions.
8. Construct algebraic functions to model simple real-life problems.
9. Translate verbal descriptions of transformations to function notation and vice versa. Interpret and graph multiple transformations of functions.
10. Analyze and graph quadratic functions. Solve optimization problems modelled with quadratic functions.
11. Graph polynomial functions using symmetry, end behaviour and behaviour near their x-intercepts. Analyze graphs of polynomial functions and construct possible equations.
12. Determine the domain, intercepts and the equations of horizontal and vertical asymptotes for rational functions.
13. Solve polynomial and rational inequalities.
14. State the Remainder, Factor and Rational Zeros Theorems and use these theorems to factor polynomials and find the real zeros.
15. Compose and decompose functions. Verify that two functions are inverses using the definition of inverse functions. Find inverse functions algebraically and graphically.
16. Explain the relationship between exponential and logarithmic functions. Graph exponential and logarithmic functions and their transformations.
17. Use the properties of logarithms to simplify expressions and solve equations.
18. Solve applied problems involving pH, the Richter scale, decibels, compound interest, exponential growth, exponential decay and logistic growth.
19. Convert between degree and radian measure.
20. Sketch graphs of the sine and cosine functions using their unit circle definitions. Graph transformations of these functions.
21. Define the tangent, cotangent, secant and cosecant functions in terms of the sine and cosine functions. Graph the tangent, cotangent, secant and cosecant functions using the sine and cosine graphs.
22. State the right triangle definitions for the trigonometric functions. Use reference triangles to find exact values of trigonometric functions.

23. Derive the Pythagorean identities and the double angle identities. Use the Pythagorean identities, the sum and difference identities and the double angle identities to simplify expressions and verify other identities.
24. Find exact values for compositions of trigonometric and inverse trigonometric functions.
25. Find exact and approximate solutions of basic trigonometric equations.
26. Identify patterns in sequences and write formulas for the general terms. Write the terms of recursively defined sequences. Express sums using summation notation.
27. Identify arithmetic and geometric sequences and derive formulas for their nth terms. Find the sums of the first n terms of these sequences. Solve word problems involving arithmetic and geometric sequences and series.

3.   Required Materials

(a) Textbook *Algebra & Trigonometry*, Second Custom Edition for Camosun College, by Michael Sullivan

(b) Sharp EL-531X calculator (or other comparable non-programmable scientific calculator)

4.   Course Content and Schedule

Course Content:

Chapter R:	Sections R.5-R.8
Chapter 1:	Sections 1.1, 1.2, 1.4, 1.5
Chapter 2:	Sections 2.1-2.4
Ellipses	loosely based on 11.3
Chapter 3:	Sections 3.1-3.6
Chapter 4:	Sections 4.1, 4.3-4.5
Chapter 5:	Sections 5.1-5.5
Chapter 6:	Sections 6.1-6.8
Chapter 7:	Sections 7.1-7.8
Chapter 8:	Sections 8.1-8.5, 8.7, 8.8
Chapter 13:	Sections 13.1-13.3

Quizzes
We will have a quiz at the end of each Wednesday class. These will consist of 2 questions on a topic taken from the previous 2 lectures, and are to be handed in for marks. Missed quizzes will result in a mark of 0; however, I will drop your lowest 2 quiz marks when calculating your final grade (the lowest 2 marks will include the 0 marks from any missed quizzes).

Estimated out-of-class hours
To be successful in this course, you should expect to spend about **7 hours per week** studying and doing the suggested problems.

Math Lab
Free tutoring is available in the Math Labs in Ewing 224 and 342. The hours are posted on the doors. It is a great idea to do your homework there and get help whenever needed

5.   Basis of Student Assessment (Weighting)*

(a) Tests   45%

(b) Quizzes   5%

(c) Final Exam   50%

*If your term work is complete and satisfactory, then your final exam may count for 100% of your final mark if this increases your final mark.

6. **Grading System**

   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	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

   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 E-1.5 at **camosun.ca** 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, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. *(For these courses a final grade will be assigned to either the 3rd course attempt or at the point of course completion.)*
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.

7. **Recommended Materials or Services to Assist Students to Succeed Throughout the Course**

   LEARNING SUPPORT AND SERVICES FOR STUDENTS

   There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services, or the College web site at camosun.ca.

   STUDENT CONDUCT POLICY

   There is a Student Conduct Policy **which includes plagiarism**.
   It is the student's responsibility to become familiar with the content of this policy.
   The policy is available in each School Administration Office, at Student Services,
   and the College web site in the Policy Section.

Suggested Problems

Do the **odd** numbered questions in the given ranges unless otherwise stated. Answers to these questions are in the back of the textbook. Questions in **BOLD** are recommended for those going on to Math 100.

R.5 Factoring Polynomials   15-115 every second odd
R.7 Rational Expressions 11, 15, 19, 23, 29, 33, 41, 49, 59, 65, 69, 75, 79, 83, 85 – 91, **93**
R.8 *n*th Roots; Rational Exponents   13-33 every second odd, 41, 47, 53, 59, 65, 71, 73, 75-79, 81-97

1.1 Linear Equations   29, 33, 37, 41, 51, 57, 63, 73, 77, 79, 97
1.2 Quadratic Equations   15, 23, 27, 33, 41, 45, 61, 65, 69, 75, 89, 91, 97, 101, 103, 105
1.4 Other Equations   23, 27- 31, 35, 39, 45, 49, 51, 59, 61, 65, 69, 71, 83, 85, **91, 93, 95**
1.5 Solving Inequalities   23, 31, 35, 65, 67, 73, 75, 81, 83, 87, 89, 91-97, 101, 105

2.1 Distance & Midpoint Formulas 8, 13, 19, 27, 29, 35, 39, 45, 47, 49, **54**, 55, 57, 61
2.2 Graphs, Intercepts & Symmetry 11, 23, 33, 55, 61, 65, 69, 75, 79, 81**, 85**
2.3 Lines 4, 10, 11, 17, 25, 31, 35, 41, 43, 47 – 69, 77, 83, 85, 93, 97, 101, 102, 105, 131
2.4 Circles 5, 6, 9, 15, 19, 23, 27, 31- 41, **47**

11.3 Ellipse   17-25, 37, 39, 43-53   no foci

3.1 Functions 15, 19, 29, 33, 39, 43, 45, 47, 51, 57, 61, 69, 73-80, 81, 85, **87**
3.2 Graphs of Functions 6, 7, 8, 9, 13, 23, 25, 35
3.3 Properties of Functions 8, 9, 10, 11-19, 21, 29, 33 – 43, 53, 59, 63a, **75a, 80a, 81**
3.4 Library of Functions 6, 8, 17-21, 25-37, **42**
3.5 Transformations 4, 5, 6, 7-33, 41, 45, 48, 51 – 61, 69, **71**
3.6 Building Functions 1(a,b,c), 3a, 5, 7(a&b), 9(a&b), 11(a&b), **13**, **15**, **23**

4.1 Linear Functions 10, 11, 12, 17, 19, 29, 31, 41, 45, 49, 51
4.3 Quadratic Functions and Their Properties 8, 9, 10, 11-17, 21, 27, 33, 35, 39, 47, 57, 61, 65, 69
4.4 Quadratic Models 5, 7, 8, 9, 10, 15, **17**
4.5 Inequalities Involving Quadratic Functions 11-17, **19**, **25**, **29**

5.1 Polynomial Functions   8, 9, 12, 13, 27, 33, 35, 37, 39, 43, 47, 55, 57, 61, 69, 75, 77, 85, 87
5.2 Properties of Rational Functions   8, 9, 10, 19, 21, 30, 31, 33, 39, 41, 45, 51   no oblique asymptotes
5.3 The Graph of a Rational Function   4, 5, 9, 13, 23, 35
5.4 Rational and Polynomial Inequalities 2, 15, 17, 23, 27, 31, **39**, **45**
R.6 Synthetic Division 7, 15 – 21, **25, 27**
5.5 The Real Zeros of a Polynomial Function 8, 9, 11, 15, 19, 33,37, 39, 45, 55, 57, 61, 69, 75, 77, **89**, **103**, **105**

6.1 Composite Functions   5, 9, 10, 13-19, 21, 35, 43, 53 – 57, 59, **65, 71**
6.2 Inverse Functions   7, 8, 13,15, 21, 22, 31-39, 57, 61, 63, 65, 73, 75, **82**
6.3 Exponential Functions   3, 5, 9, 10, 37, 43, 49 – 53, 57-79, **104a**
6.4 Logarithmic Functions   7, 8, 9- 47 (every second odd), 51, 57, 59,71, 79, 83, 87 – 109, 111, 113
6.5 Properties of Logarithmic Functions   4, 5, 6, 7- 63 (every second odd), 65, 67, 79, 81, **83-87**, **91, 95, 100**
6.6 Logarithmic and Exponential Equations   1-59 (every second odd), 75, 79, 81, **85, 87, 99**
6.7 Compound Interest   3, 11, 15, 19, 23, 31, 35, 41, **45**
6.8 Growth and Decay   1 - 9, 10, **11**, **21,** 25

7.1 Angles and Their Measure   6, 7, 8,9, 17, 19, 35, 39, 43, 49, 53, 57, 61, 67, 71, 75, 79, **91**
7.2 Right Triangle Trig I   7, 8, 9, 10, 13, 23, 25-53 (every second odd), 55, 57, 59, **72**
7.3 Right Triangle Trig II   3, 4, 5, 6, 10, 12, 15, 17-29, 35, 39, **49, 55, 59**
7.4 Trig Functions of Any Angle   4, 5, 6, 13, 19, 23, 29, 33-99 (every second odd), **107, 117**
7.5 Unit Circle Approach   8, 9, 11, 15, 19-53 (every second odd), 55, 59, 60, 61, 63, 67, **73, 81**
7.6 Graphs of the Sine and Cosine Functions   6, 7, 8, 19, 21, 25, 27, 43, 46, 47, 51, 53, 55, 57, 61, 65, 67, 69
7.7 Graphs of the Other Four Trig Functions 2, 6, 7, 11, 13, 15, 21, **22, 23, 29, 38, 39, 43**
7.8 Phase Shift; Sinusoidal Curve Fitting   2, 3, 5, 9, 11, 15, 17, **19, 20, 21, 22**

8.1 Inverse Sine, Cosine and Tangent Functions   4, 10,11,12,13,15, 17,19, 23, 27, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 61, 63 , **65**
8.2 Inverse Trig Functions II   **6, 7, 8, 9-45 (every second odd), 47- 55 (every second odd), 57 - 65**
8.3 Trig Identities   6, 9 – 91 (every second odd), **93 -101**
8.4 Sum & Difference Formulas   6, 7, 8, 9-61 (every second odd), **69, 73, 75, 79, 81, 83, 87, 89, 93, 95**
8.5 Double Angle & Half Angle Identities   4, 5, 6, 7a&b, 9a&b, 15a&b, **21, 27, 41,** 47, 51, **56,** 62, 64, **68, 69, 75, 79**
8.7 Trig Equations I   5, 6, 7, 9, 11, 19, 21, 23, 25, 31, 33, 35, 41, **55**
8.8 Trig Equations II   5-9, **23, 29, 31, 37, 39, 43, 45, 49**

13.1 Sequences 6, 7, 8, 17, 19, 25, **27 – 33**, 35, 41, 43, 45, 49, 51, 57, 59, 61, 65, 69-79
13.2 Arithmetic Sequences & Finite Series 2, 5, 7, 15, 19, 21, 27, 31, 35, 39, 41, **51**
13.3 Geometric Sequences & Series 6, 7, 8, 9, 11, 15, 19, 25, 27, 33, 37, 41, 47, 49, 55, 57, 61, **85**