COURSE OUTLINE

Calendar Description: *Designed for the prospective elementary school teacher.* Topics include: numeration systems, algorithms for addition, subtraction, multiplication and division, sequences, prime numbers, divisibility, cryptography, probability experiments, symmetry, polygons, tessellations, geometric constructions, congruence, area, Pythagorean theorem, similarity, surface area, volume, polyhedra, topological equivalence of shapes, recreational topology, perspective in art, spherical geometry.

Prerequisites: "C" in Principles of Math 11, or Pre-calculus 11, or Foundations of Math 11, or Applications of Math 12, or MATH 073, or MATH 137; **or** "C+" in either MATH 135 or MATH 072; **or** assessment

To find where this course transfers, check the *BC Transfer Guide*

1. Instructor Information

(a)	Instructor:	Stephen Benecke
(b)	Office:	E254
(c)	Phone:	250-370-3493
(d)	Email:	stephen.benecke@gmail.com
(e)	Webpage:	http://stephen.ministryofconstructions.com/math/
(f)	Desire2Learn page	NA
(g)	Office Hours:	10:30 – 1:20

Exit Grade: A grade of at least **C** (60%) is required for entry into most university education programs.

### 2. Intended Learning Outcomes:

1. Convert between selected past and present numeration systems.
2. Analyze and validate different algorithms for addition, subtraction, multiplication and division.
3. Deduce and/or use formulas for terms and sums of terms of selected sequences (arithmetic, geometric, power).
4. Demonstrate competence in selected topics from number theory including prime numbers, GCD and LCM, modular (clock) arithmetic, the binary sequence, Pascal's triangle, and Venn diagrams.
5. Apply classic tests for divisibility.
6. Decode messages encrypted by substitution and modular (clock) arithmetic.
7. Execute classic probability experiments (capture-recapture, randomized responses, Plinko, the Monty Hall problem).
8. Apply triangle congruence, triangle similarity, and Euclidean constructions to geometric problems.
9. Identify classic proofs of the Pythagorean Theorem and apply the theorem to Pythagorean triples.
10. Derive and use measurement formulas for classic 2-D and 3-D figures.
11. Identify the use of perspective in classic artworks.
12. Apply the postulates of spherical geometry.
13. Identify the kinds of symmetry in polygons and selected graphics.
14. Create tessellating artwork with modified polygons using manual techniques and by accessing Tessellation Exploration software.
15. Construct regular and semi-regular polyhedra by joining faces, using strut construction, by assembling paper nets, and by using paper folding (modular origami).
16. Build a tetrahedron kite, an icosahedron globe or geodesic, and polyhedra bubbles.
17. Identify topological properties of shapes, networks, mazes, and maps.
18. Assemble and use flexagons and kaleidocycles.

3. Required Material:
(1) Textbook: Reconceptualizing Mathematics for Elementary School Teachers by Judith Sowder, Larry Sowder, and Susan Nickerson. Freeman, 2014.

Note: Although the bookstore sells the package "text book + solutions manual", only the textbook alone is required for this course.

4. Course Content: Chapters
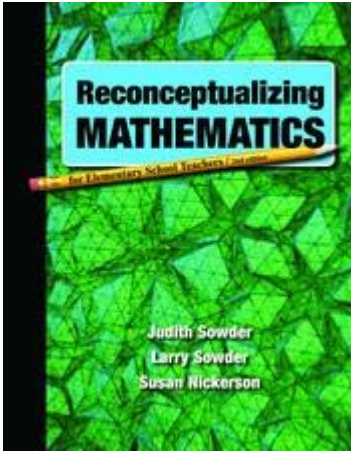
16. Polygons
17. Polyhedra
18. Symmetry
20. Similarity
22. Transformation Geometry
23. Measurement Basics
24. Area, Surface Area, and Volume
25. Counting Units Fast: Measurement Formulas
26. Special Topics in Measurement
27. Quantifying Uncertainty
28. Determining More Complicated Probabilities
33. Special Topics in Probability
10 Integers and Other Number Systems
11 Number Theory
12 What's Algebra

5. Basis of Student Assessment (Weighting)

(a) Assignments: 16%
(b) Term Tests: 34%
(c) Final Examination: 50%
The final exam will cover the entire course and will be 3 hours long

All tests must be written during the scheduled times. In the event that you missed a test due to family emergency or illness, the weight of the test will be put on the final exam *if* the instructor is notified *before* the event. <u>NO</u> late assignments will be accepted for credit. Final examinations will be scheduled by the college and they will take place during …………………. You must be available to write the final examination at the scheduled time. Holidays or scheduled flights are not considered as emergencies.

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

6. Recommended Materials or Services to Assist Students to Succeed Throughout the Course
There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of Academic Policies and Procedures at
http://camosun.ca/learn/calendar/2010/pdf/academic.pdf. 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.bc.ca.