



**DEPARTMENT OF SCIENCE**

**COURSE OUTLINE – FALL 2016**

**MA2600 A2: Topics in Mathematics – 3 (3-2-0) UT**

**75 Hours, 15 Weeks**

**INSTRUCTOR:** Dr. Brian Redmond  
**OFFICE:** J206

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**OFFICE HOURS:** T/R 10-11:30 AM

**CALENDAR DESCRIPTION:**

Problem solving in different areas of mathematics. Topics include: inductive and deductive reasoning; Introduction to logic, truth tables, and Venn diagrams; Mathematical Induction; Euclidean geometry, curves, polygons, area, volume, and geometric constructions; Angle measurement and Trigonometry; Counting methods and the Pigeonhole Principle, Factorials, Permutations and Combinations, Introduction to Probability.

**PREREQUISITE:** MA 1600 or any 1000-level Math course

**REQUIRED TEXT/RESOURCE MATERIALS:**

- Mathematical Ideas, Thirteenth Edition, by Miller et al. (Pearson 2016)
- A basic trigonometry set, including a ruler, protractor and compass

**DELIVERY MODE(S):** This is a lecture based course.

**COURSE OBJECTIVES:** This course is designed to provide students with a broader and deeper understanding of the mathematics underlying the elementary school curriculum and beyond, and to further develop their reasoning skills in mathematics. Thus, an emphasis will be placed on problem-solving and non-calculator based techniques.

**LEARNING OUTCOMES:**

By the end of the course, students will be able to:

Part 1: Logic:

- Form and interpret compound statements symbolically using negations, conjunctions, disjunctions, and quantifiers
- Construct truth tables and determine equivalent statements
- Form and interpret the conditional and related statements
- Analyze arguments using Venn/Euler diagrams
- Analyze arguments using truth tables
- Use Mathematical Induction to prove simple statements about the natural numbers and other well-founded sets

## Part 2: Geometry:

- Identify relationships among points, lines and planes
- Classify and calculate angles
- Classify curves
- Learn the vocabulary of circles
- Identify and classify triangles and quadrilaterals
- Perform geometric constructions
- Understand and apply the trigonometry of right triangles
- Recognize congruent triangles
- Determine similar triangles
- Learn and apply the Pythagorean theorem
- Determine the perimeter of a polygon
- Determine the areas of polygons and circles
- Determine the circumference of a circle
- Classify space figures
- Calculate surface area and volume of common space figures

## Part 3: Counting Methods:

- Use a systematic approach to counting
- Know the meaning of uniformity in counting and understand the fundamental counting principle
- Use the fundamental counting principle to solve counting problems
- Use factorials to determine the number of distinguishable arrangements of  $n$  objects
- Calculate and solve problems involving permutations and combinations
- Calculate derangements
- Construct Pascal's triangle and use it to solve applications involving combinations
- Understand and apply the complements principle of counting
- Understand and apply the additive principle of counting
- Understand and apply the Pigeon Hole principle

## Part 4: Probability:

- Understand the basic terms in the language of probability
- Understand the law of large numbers
- Calculate theoretical and empirical probabilities
- Determine the odds in favour of an event and the odds against an event
- Know that the probability of an event is a real number between 0 and 1, inclusive
- Determine the probability of "not A", "A or B", and "A and B", given the probabilities of A and B
- Apply the conditional probability formula
- Determine whether two events are independent
- Apply the multiplication rule of probability
- Apply the binomial probability formula for an experiment involving Bernoulli trials
- Calculate the expected value of a random variable and apply linearity of expected value in problem solving applications
- Determine if a game of chance is fair

## TRANSFERABILITY:

MRU

Athabasca University

University of Alberta \*

University of Calgary

Grant MacEwan University

**\*Warning:** Although we strive to make the transferability information in this document up-to-date and accurate, **the student has the final responsibility for ensuring the transferability of this course to Alberta Colleges and Universities.** Please consult the Alberta Transfer Guide for more information.

You may check to ensure the transferability of this course at Alberta Transfer Guide main page

<http://www.transferalberta.ca> or, if you do not want to navigate through few links, at

<http://alis.alberta.ca/ps/tsp/ta/tbi/onlinesearch.html?SearchMode=S&step=2>

\*\* Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability**

## EVALUATIONS:

- Worksheets 20%
- Midterms 20% (x2)
- Final Exam (cumulative) 40%

## GRADING CRITERIA:

Please note that most universities will not accept your course for transfer credit **IF** your grade is **less than C-**.

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	95-100	C+	2.3	66-69
A	4.0	90-94	C	2.0	62-65
A-	3.7	85-89	C-	1.7	58-61
B+	3.3	80-84	D+	1.3	55-57
B	3.0	75-79	D	1.0	50-54
B-	2.7	70-74	F	0.0	00-49

## **COURSE SCHEDULE/TENTATIVE TIMELINE:**

Week 1	Aug. 31-Sept. 2	Wed. Aug. 31 first day of class
Week 2	Sept. 5-9	Mon. Sept. 5 Labour Day – College closed
Week 3	Sept. 12-16	
Week 4	Sept. 19-23	
Week 5	Sept. 26-30	
Week 6	Oct. 3-7	
Week 7	Oct. 10-14	Mon. Oct. 10 Thanksgiving Day – College closed
Week 8	Oct. 17-21	<b>Mon. Oct 17 – Midterm Exam 1</b>
Week 9	Oct. 24-28	Wed. Oct. 26 Last day to withdraw with permission
Week 10	Oct. 31-Nov. 4	
Week 11	Nov. 7-11	Nov 10/11 Fall break/Remembrance Day
Week 12	Nov. 14-18	
Week 13	Nov. 21-25	<b>Wed. Nov. 23 – Midterm Exam 2</b>
Week 14	Nov. 28-Dec. 2	
Week 15	Monday, Dec. 5	Last day of classes
Final Exam Period	Dec. 7-16	

**STUDENT RESPONSIBILITIES:** Regular attendance and participation (including homework) is required for the successful completion of this course. Assignments must be handed in on time, and tests/exams must be written on the days announced in class. If an emergency prevents a student from writing a test/exam on the scheduled day, the student must contact the instructor immediately to make other arrangements. Otherwise, the student will receive a zero grade for that component of the course.

### **STATEMENT ON PLAGIARISM AND CHEATING:**

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the College Admission Guide at <http://www.gprc.ab.ca/programs/calendar/> or the College Policy on Student Misconduct: Plagiarism and Cheating at <http://www.gprc.ab.ca/about/administration/policies/>

\*\*Note: all Academic and Administrative policies are available on the same page.