

MATH 260A: Topics in Mathematics*3 Credits, 3 hours lecture*

Problem solving in different areas of mathematics. Note: This course is intended for Education students and is not open to science students.

Prerequisites: Math 160 or teaching experience at elementary or junior high school level.

Instructor

Instructor Name: Matthew Morin

Office location: S211E

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Office Hours

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|-----------|---------------|
| Monday | 14:00 – 15:00 |
| Tuesday | 14:00 – 15:00 |
| Wednesday | 14:00 – 15:00 |
| Thursday | 10:00 – 11:00 |
| Friday | 14:00 – 15:00 |

Hours of Instruction

| | |
|-----------|----------------------|
| Monday | 13:00 – 13:50 (S112) |
| Wednesday | 13:00 – 13:50 (S112) |
| Friday | 13:00 – 13:50 (S112) |

Required Resources

No course textbook. Resources available on Moodle (<http://ilearn.keyano.ca>).

Course Outcomes

At the completion of the course, students will be able to:

- Use recreational methods to showcase mathematical ideas and methods.
- Explain what is meant by winning and drawing strategies and apply the Sprague-Grundy method to find said strategies.
- Create graphs to model a variety of problems and utilize the structure of the graphs in order to solve the problems.
- Convert between worded statements and logic notation and evaluate the truth value of a variety of compound statements.
- Analyze arguments using the theory of logic.
- Understand and apply geometric properties and relationships to determine the measure of angles and/or measure of sides within complex figures.
- Decide whether two triangles may be congruent or similar.
- Solve linear and quadratic equations using algebraic techniques.
- Apply elimination and substitution techniques to solve systems of linear equations.
- Calculate probabilities using the classical and empirical methods and describe the difference

between these methods.

- Use the addition and multiplication rule to compute probabilities of events including “or” and “and” statements.

Evaluation

| | |
|-------------------|------|
| Assignments | 20% |
| Math Fair Project | 10% |
| Midterm Exam | 25% |
| Final Exam | 45% |
| Total | 100% |

A grade of C- is required for progression or transfer.

Assignments:

In any mathematics course the best way “to learn” is “to do.” The instructor can teach you about the course ideas and demonstrate the mechanics of solving the problems—and can make it look very easy—but growing adept at solving these problems will take a lot of practice and can be a struggle. Although the assignments do not count for a large part of your final grade they are essential in preparing you for the types of problems you will be solving on the exams.

Assignment completion is a requirement of the course. Failure to complete all the assignments may result in a failing grade for the course.

The assignments are sets of problems (posted on Moodle) that you will solve at home then hand in your solutions to in-class. A cover page is not required, but the assignment number, the course number, and your name should be clearly written on the front page. The solutions to the problems should be presented in the order that they were listed in the assignment. If more than one page is needed, then the pages should be stapled together (in the proper order). A late assignment may be accepted, or may incur a penalty depending on the circumstances. Once marked assignments are returned to the class, no further late assignments can be submitted.

In addition to the submitted paper copy, **a digital version of each homework set must also be uploaded to our course’s Moodle page.** If your solutions are handwritten, you may scan your work at one of the college photocopiers (such as the Library, the Skill Center, or the Info Commons), have the copier email the scan(s) to your Keyano email account, and then upload to our Moodle page.

Although you are permitted to work with other students while completing assignments, it is essential that the work you present is your own—see the section on Academic Misconduct later in this outline for more information. Presenting other students’ solutions as your own may result in serious academic penalties. If you are working together with other students on a problem, it is vital that at the end of the process YOU know how to solve the problem and that YOU write out your own solution in your own way. If there is suspicion of academic misconduct, you will be required to defend the work you have submitted.

It is recommended that you attempt the assignments yourself before talking over problems with your classmates. If you need help with a problem you can come to office hours, visit the Skill Center, and (yes) talk to your classmates. However, this does not mean looking through a classmate’s solution. Rather, it is best if you talk about the problem. If you do not understand what the problem is asking for, then it could be useful to read through the relevant sections of the course notes.

Assignment completion is a requirement of the course. Failure to complete all the assignments may result in a failing grade for the course.

Math Fair Project:

As individuals or in small groups, each “group” will be responsible for creating a project for a Math Fair activity to be used in this year’s fair. This activity should be approachable (without any specific mathematical knowledge), but it should make use of some type of mathematical thinking (logic, problem solving, etc.). More details will be provided in-class and on our Moodle page.

Tests:

All tests will be written and are closed-book. For this class, basic calculators are permitted during the exams. The dates of the tests will be announced in-class and on Moodle well in advance of the test date. The details of the topics covered by tests will be given and a sample test will usually be provided. These tests are meant to test how well you have “mastered” the subject matter. Satisfactory completion of the relevant assignment problems, reading the relevant textbook sections, and studying the course notes is the very minimum amount of work that should prepare you for the types of problems that could appear on a test. However, as the larger tests are cumulative in nature, you may be solving problems that require ideas that bridge across several sections of the course.

Grading System

| Descriptor | Alpha Grade | 4.0 Scale | Percent | Rubric for Letter Grades |
|------------------------------------|-------------|-----------|-----------|--|
| Excellent | A+ | 4.0 | > 92.9 | Work shows in-depth and critical analysis, well developed ideas, creativity, excellent writing, clarity and proper format. |
| | A | 4.0 | 85 – 92.9 | |
| | A- | 3.7 | 80 – 84.9 | |
| Good | B+ | 3.3 | 77 – 79.9 | Work is generally of high quality, well developed, well written, has clarity, and uses proper format. |
| | B | 3.0 | 74 – 76.9 | |
| | B- | 2.7 | 70 – 73.9 | |
| Satisfactory Progression | C+ | 2.3 | 67 – 69.9 | Work has some developed ideas but needs more attention to clarity, style and formatting. |
| | C | 2.0 | 64 – 66.9 | |
| | C- | 1.7 | 60 – 63.9 | |
| Poor | D+ | 1.3 | 55 – 59.9 | Work is completed in a general way with minimal support, or is poorly written or did not use proper format. |
| Minimum Pass | D | 1.0 | 50 – 54.9 | |
| Failure | F | 0.0 | < 50 | Responses fail to demonstrate appropriate understanding or are fundamentally incomplete. |

Proposed Schedule of Topics

| Week | Dates | Topic |
|------|--|--|
| 1 | Sept. 3 - Sept. 7 (No classes Sept. 3,4) | Two-Player Games |
| 2 | Sept. 10 - Sept. 14 | Strategies, Sprague-Grundy Method |
| 3 | Sept. 17 - Sept. 21 | Modelling Word Problems, Systems of Linear Equations |
| 4 | Sept. 24 - Sept. 28 | Solving Quadratics, Graph Terminology |
| 5 | Oct. 1 - Oct. 5 | Isomorphism, Euler Circuits |
| 6 | Oct. 8 - Oct. 12 (No classes Oct. 8 th) | Hamilton Circuits, Planar Graphs |
| 7 | Oct. 15 - Oct. 19 | Graph Colouring, Logic: Statements and Connectives |
| 8 | Oct. 22 - Oct. 26 | Midterm Exam Logic: Statements and Connectives (cont.) |
| 9 | Oct. 29 - Nov. 2 | Truth Tables and Arguments |

| Week | Dates | Topic |
|------|--|---|
| 10 | Nov. 5 – Nov. 9 (No classes Nov. 8, 9) | Basic Geometry, Congruent Triangles |
| 11 | Nov. 12 – Nov. 16 (No classes Nov. 12 th) | Congruence (cont.), Similar Triangles |
| 12 | Nov. 19 – Nov. 23 | Quadrilaterals, Area (Math Fair!) |
| 13 | Nov. 26 – Nov. 30 | Basics of Probability |
| 14 | Dec. 3 – Dec. 7 (No classes Dec. 7 th) | Compound Events, Independence/Dependence |
| | Dec. 10– Dec. 14 | Exam Period: Dec. 10 – 18 Grades Due: Dec 20 |
| | Dec. 17– Dec. 21 | |

Please Note:

Date and time allotted to each topic is subject to change.

Performance Requirements**Student Responsibilities**

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the Keyano College credit calendar.

More specific details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

Laboratory Safety

In the science laboratories, safety is important.

Students must complete the *WHMIS for Students* online training course on Moodle before entering the science laboratories.

Students must comply with the mandatory laboratory safety rules for this course as provided in the laboratory manual. Failure to do so will result in progressive discipline such as a verbal warning, refused entry into the laboratory, or suspension from the College.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a students' learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and / or notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own
- The use of unauthorized aids in assignments or examinations (cheating)
- Collusion or the unauthorized collaboration with others in preparing work
- The deliberate misrepresentation of qualifications
- The willful distortion of results or data
- Substitution in an examination by another person
- Handing in the same unchanged work as submitted for another assignment
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Student Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Student Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work will not be graded until you show this signed certificate.

Specialized Supports

The Student Academic Support Services (SASS) department: Accessibility Services, Skill Centre and Wellness Services, work together to support student success at Keyano College.

Accessibility Services (CC167) supports student success through group and individualized instruction of learning, study and test taking strategies, and adaptive technologies. Students with documented disabilities, or who suspect a disability, can meet with the Learning Strategists to discuss accommodation of the learning barriers that they may be experiencing. Students who have accessed accommodations in the past are encouraged to visit our office at their earliest opportunity to discuss the availability of accommodations in their current courses. Individual appointments can be made by calling 780-791-8934

Skill Centre (CC119) provides a learning space where students can gather to share ideas, collaborate on projects and get new perspectives on learning from our tutorial staff. Students visiting the centre have access to one-to-one or group tutoring, facilitated study groups, and assistance in academic writing. The Skill Centre's Peer Tutor program provides paid employment opportunities for students who have demonstrated academic success and want to share what they have learned. Tutoring is available free to any students registered at Keyano College on a drop in basis, from 9:00 am to 5:00 pm Monday through Friday. Additional evening hours are subject to tutor availability and are posted in the Skill Centre.

Wellness Services (CC260) offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. The Mindfulness Room in CC260 is available as a quiet space for students to relax during regular office hours. Wellness Service welcomes students to participate in any of the group sessions offered throughout the academic year addressing such topics as Mindfulness and Text Anxiety. Individual appointments can be made by calling 780-791-8934.

Please watch your Keyano email for workshop announcements from our Student Academic Support Services team.