

Math 2090 Course Outline

Spring 2019

1 Basic course information

Course title: *Math 2090*, Number Systems

Course instructor: [Sean Fitzpatrick](#).

Email: sean.fitzpatrick@uleth.ca

Office: C540.

Course website: via [Moodle](#)

Course textbook: none. But there is a list of links to free textbooks on Moodle.

Class schedule: Monday, Wednesday, and Friday, 9:00-9:50 am in AH177, and Tuesday 9:25-10:15 in D631.

Grading: see [Section 3](#).

2 Course Description

2.1 Overview

Math 2090 is a mathematics course intended for students who would not otherwise take a course in mathematics at university, and intend to train as elementary school teachers in the Faculty of Education. No particular mathematical background is assumed, and some prior discomfort with mathematics is anticipated.

Since Math 2090 is a terminal course, we have some freedom in the topics we'll cover. Most of the topics will be set ahead of time, but some will be chosen according to class preferences. We will begin with a short review of basic arithmetic before moving on to the historical evolution of numbers. This will lead to a discussion of different ways to represent numbers, including numbers in other bases.

The “higher mathematics” portion of the course begins with a look at different sets of numbers, such as integers, rational numbers, and real numbers. We'll briefly look at the mathematical concept of **sets**, and the abstract notion of a **binary operation** on a set. Binary operations include familiar ideas such as addition and multiplication. By studying binary operations in the abstract, we hope to gain a deeper understanding of why the rules of arithmetic work the way that they do.

Additional topics will include prime numbers and divisibility, and **modular arithmetic**. Modular arithmetic is sometimes known as “clock arithmetic”: it is the sort of counting that takes place whenever the count “resets” after a fixed value; 12, in the case of a clock, where $8 + 6 = 2$, since 6 hours after 8 o'clock, it is 2 o'clock!

2.2 Tentative topics schedule

- Week 1 (January 7 - 11): Numeration systems, adventures in arithmetic.
- Week 2 (January 14 - 18): Historical development of numeration systems.
- Week 3 (January 21 - 25): Numbers in other bases.
- Week 4 (January 28 - February 1): Sets and set operations.
- Week 5 (February 4 - 8): Binary operations and their properties.
- Week 6 (February 11 - 15): Sets of numbers.
- Week 7 (February 25 - March 1): Division and Fractions.
- Week 8 (March 4 - 8): Congruence.
- Week 9 (March 11 - 15): Modular arithmetic.
- Week 10 (March 18 - 22): Divisibility and prime numbers.
- Week 11 (March 25 - 29): Greatest common divisors.
- Week 12 (April 1 - 5): Class choice.

For the final week (or two weeks, depending on how fast we progress, and whether we skip any topics), the class will decide what we discuss. Topics should involve connections between mathematics and society. Examples could include encryption, voting, finance, statistics, etc.

3 Coursework and evaluation

3.1 Course activities

There are several different activities that can be completed to earn your grade in this course. Some activities, like quizzes, will have a fixed number. Others, like forum posts, can be done as often as you want. Each activity will have a maximum allowed contribution towards your total. We'll review class progress at the break to determine if any of the maximums should be changed.

Component	Individual Contribution	Maximum contribution
Forum posts	10	150
Journal entries	10	150
In-class presentations	20	100
Assignments	25	200
Quizzes	20	200
Paper	200	200
Final exam	200	200

Table 3.1: Values of graded activities for Math 2090

3.2 How are letter grades calculated?

Each time you complete one of the activities above, you earn points toward your final grade. (Points are indicated in the second column.) Items will be assigned a score between 0 and the value of that contribution. (For example, a journal entry will receive a grade out of 10.) In most cases, work can be revised.

Your final grade will be based on the number of points accumulated by the end of the semester. Note that this means none of the activities are mandatory, including the final exam. Your job is simply to make sure you earn enough points to get your desired letter grade.

A+	A	A-	B+	B	B-
Over 1000	925-999	900-924	875-899	825-874	800-824
C+	C	C-	D+	D	F
775-899	725-774	700-725	650-699	600-649	0-599

Table 3.2: Letter grade conversions

3.3 Description of course components

- There will be two discussion forums. One for sharing and commenting on articles and material of relevance to the course, and one for getting help on the mathematical content of the course. Sharing a link to content, together with a summary of the content and its relevance, can earn up to 10 points. Asking a good question in the help forum is worth up to 5 points, and good answers are worth up to 10.
- The journal will be a blog entry on Moodle where you summarize on what you've learned. This could be a reflection on a class activity, your thoughts on mathematical content you found challenging, commentary where you see something fitting (or not) into your teaching, etc. Each entry earns up to 10 points.
- An in-class presentation is worth up to 20 points. This does not mean you have to give a lecture. It can be as simple as telling the class about some particularly interesting article you came across. In some cases I might suggest topics for you to investigate in groups.
- An assignment will consist of several problems related to the mathematical content in the course. I'll provide some time for you to work on these with others in class, but you will probably need to finish them at home.
- Quizzes will be weekly, and short. There may be a group component.
- The paper can be on any topic related to the class. Expected length is somewhere in the 6-10 page range. I do not have a preference on citation format, but I do expect there to be references. The usual guidelines on plagiarism apply.

4 Course policies

This section deals with questions about day-to-day operation of the course, accommodations, missed tests, and other exceptional (yet common) cases.

4.0.1 How do I find you if I need help with something?

My office is C540, in University Hall.

Office hours will be available on Moodle and maybe even on my office door.

4.0.2 Do I need to make an appointment for office hours? What if I have class at that time?

You don't need an appointment – just drop in. **Office hours** are the times that I promise to be available for consultation. If the times I choose don't work, you can email me for an appointment.

4.0.3 What if it's not related to the course?

Come see me anyway, or send an email. If I can't help you myself, I'll direct you to someone who can. There's some [great general advice for students](#) on the U of L website. They've got some great answers to related questions there.

4.0.4 OK, but what if it's kind of personal?

If it affects your ability to participate in the course (or even if it doesn't), you can come talk to me. In many cases, you might be best off seeing Academic Advising or Counselling Services. Links to these services, and general advice, can be found on the [U of L website](#).

You may also want to visit the University's [Health and Safety website](#) for information on other resources on campus.

4.0.5 One of the tests conflicts with something else in my schedule. What are my options?

If you know in advance that you will not be able to attend a test for a “reasonable reason”, like varsity athletics, a conference, tea with the Queen, etc., send me an email. We will try to arrange an alternate sitting of the test.

4.0.6 I missed a test because I was sick. What do I do? Do I get a zero?

Whoa, two questions at once! If you're sick, contact me as soon as you're able to. If your illness persists more than a day, it's unlikely we can make alternate arrangements. However, you *do not* receive a zero. That test is simply removed from your grade calculation.

4.0.7 Do I need a doctor's note?

No. This wastes health care resources and your time. Just email me to say you were sick. However, if you skip more than one test due to illness, we'll need to meet to discuss how to adjust your grade.

4.0.8 What if my car breaks down?

Same thing, for this, or other circumstances beyond your control. Send me an email, and we'll sort something out. But if there's a snowstorm forecast for the night before, maybe don't plan a trip to Calgary.

4.0.9 I'm on one of the Pronghorns teams.

Good for you!

Oh, you probably have some scheduling issues. Your coach should be providing you with a letter. Plan to meet with me during office hours one day and we'll sort something out.

4.0.10 I receive learning accommodations. What arrangements can I make?

First, make sure that you have registered with the University's [Accommodated Learning Centre](#). If you have exam accommodations, you'll need to schedule your exams with them. No need to let me know: they'll contact me to request a copy of your exam.

If you require any in-class accommodations, or if there are any adjustments I can make to facilitate your learning, please do not hesitate to get in touch with me.

4.0.11 Life intervened and I can't keep up this week. What do I do?

Send me an email. Extensions are usually granted as long as they're granted ahead of time. The cumulative nature of the grading scheme means that you can make up for missed work by doing something else of similar value.

4.0.12 I missed class. What do I do?

If it's a one-time thing, don't worry about it. Bring any work you needed to submit during office hours. If circumstances are conspiring to keep you from class on a regular basis, you'll need to meet with me to come up with alternate arrangements.

4.1 What are the policies regarding plagiarism and cheating?

Our course conforms to the University policy on academic conduct, which can be found in the [Academic Calendar](#), beginning on page 61.

4.1.1 I have a question that isn't answered here. How do I contact you?

Short answer: you can [send me an email](#). There are a few caveats, however:

- First, check the course page (and the announcements forum) on Moodle. Any information I need to communicate to the class will be posted on Moodle, or emailed to the class as an announcement via Moodle.
- Is the question about homework? Email is not a good medium for discussing math. Your best option is to ask me in person. If that doesn't work, remember that we have a help forum on Moodle.

4.1.2 I sent you an email. Why haven't you answered it yet?

Here's a short troubleshooting guide:

- Your email was not sent from a ULeth account and had no subject line: It went to my spam folder.
- Your email sent between 10 pm and 6 am: I'm asleep. I'll answer when I get to work in the morning.
- Your email sent during office hours: I'm busy helping the students who are here in person. Perhaps you should drop by yourself.
- Your email asked for help on a specific homework problem: Direct your question to the online forum.
- Your email was about something already addressed in this FAQ: I need time to come up with a polite reply.