MATH 206: Combinatorics MathLab

Syllabus for Fall 2018

Title: Combinatorics MathLab

Instructor: Daniel Dugger

Contact Info: 215 Fenton Hall, 346-8402, ddugger@uoregon.edu (also sometimes available in 205 Fenton Hall inside the main math office)

General information: 2 credits; class meets each Monday and Wednesday from 3–3:50pm in Knight Library B41.

Webpage: http://pages.uoregon.edu/ddugger/ma206.html

Prerequisites: None.

Short course description: Exploratory course in mathematics. Course focuses on techniques of mathematical exploration and discovery, the language of mathematics, and foundational issues. Topics from combinatorics.

Long course description: This is a problem-solving course in mathematics, designed to get students started on the path of learning to think like a mathematician. The problems we work on represent a hodgepodge of different kinds, mostly lying in the general area of combinatorics. Some of the skills we will focus on are: trying examples, looking for patterns, making conjectures, testing conjectures, and modifying conjectures. These might sound easy, but when you are reading mathematics you need to be constantly doing all five of these things! It takes practice.

Learning Outcomes: The goal of the MathLabs is to help students make the transition from the kind of “procedure-driven” mathematics that they see in K-12 education (and that to some extent continues in lower-division college courses) to the more creative engagement with mathematics that is required for upper-division math courses.

• Students will continue the development of the mathematical skills of trying examples, looking for patterns, and making/testing/modifying conjectures.
• Students will continue the development of the mathematical skills of explaining their reasoning to others, and in forming judgments regarding whether an explanation is adequate or not.
• Students will continue the development of the skill of critically reading an account of mathematics.
• Students will learn the basics for the LaTeX mathematical typesetting software and be able to use this to produce professional mathematical text.
Class discussions and in-class worksheets, weekly homework, and a final portfolio will provide students with opportunities to demonstrate the level of their abilities relative to the above learning outcomes.

**Organization of the course:** Each week there are two class sessions, each of which will generally be a combination of discussion and in-class exercises.

**Attendance:** Attendance is very important in this course. I will take attendance during each class, and this will contribute to your final point count in the course.

**Assessment:** Points for this course are awarded according to the following scheme:

- Attendance: 30 (1.5 points per class session)
- Weekly writing: 20 (two points per week)
- Write-up Drafts: 24 (eight points each)
- Final Portfolio: 26 (weekly writings plus four write-ups)

This course is offered as P/N only, with 84 points out of 100 being a passing grade. Work must be handed in on time, and must be in a reasonable state of completion. Mistakes can always be corrected later in the course. In this course, the only time you will be penalized for “being wrong” is on the final portfolio.

**Due dates:**

- Weekly writing is due every Monday, at the beginning of class.
- Write-up drafts are due October 10, October 31, and November 20.

The Portfolios will (mostly) be written in LaTeX, which is the main software used for mathematical typesetting. We will learn how to use this software as the course progresses.

**NOTE:** Late work is not accepted except in extreme circumstances as determined by the instructor.

**Workload:** A student should expect to spend 60 hours on this course during the term, with the work divided up roughly as follows:

- Class sessions: 2 hours per week
- Reading: 1 hour per week
- Homework: 3 hours per week.

The “Homework” portion of the workload includes three things: weekly writings on the readings, thinking about the exercises, and four “write-ups” that address topics from our exercise sessions. For the latter, you will choose four of the in-class problems we worked on during the quarter and you will give a complete write-up of the solutions. These write-ups should explain the problem, things you tried, any conjectures that arose, and explanations for the conjectures that you know how to resolve. In most cases this will just be a page or two (typewritten) per write-up.
Throughout the course you will maintain a portfolio of your work. The portfolio will contain the things you handed in each week, together with the four write-ups. After getting feedback on your work, you might choose to revise some of it before submitting your final portfolio at the end of the course. This will give you the opportunity to correct mistakes and learn from them, before getting your final grade.

**Learning Environment:** The University of Oregon strives for inclusive learning environments. Please notify me if the instruction or design of this course results in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 360 Oregon Hall at 541-346-1155 or uoaec@uoregon.edu.

**Academic Conduct:** The code of student conduct and community standards is at dos.uoregon.edu/conduct. In this course, it is appropriate to help each other on homework as long as the work you are submitting is your own and you understand it.