University of Kentucky

MA 391: Mathematics: Composition and Communication[1]
MW 3:00-4:15 PM   CB 337
Spring 2018

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Class webpage: Canvas — `https://uk.instructure.com`

Course Description: This is an undergraduate topics course in mathematics. The mathematical content of this course will be selected at the discretion of the instructor. This course satisfies the Graduation Composition and Communication Requirement for mathematics majors.

Prerequisites: The prerequisites are:
    MA 213
    one of MA 261 or MA 214
    MA 322
    one of MA 321, MA 351, MA 361, or MA 471
    AND 30 or more credit hours

Textbook: *Non-Euclidean Geometry and a Little on How We Got Here*. These are available for minimal cost at the Ricoh Center by an email request. You can make the request for your copy through the Canvas webpage. See this for further information. The book *A Mathematician's Brain* is available for download from the Canvas home page.

Suggested software: *GeoGebra* is a free software available for download at `https://www.geogebra.org`.

Course Structure and Student Learning Outcomes: Let's begin with two axioms that come from Federico Ardila, a professor at San Francisco State University.

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[1]I reserve the right to change or amend this syllabus at any time for any reason.

> **Axiom #1**: *Mathematical talent is uniformly distributed, irrespective of geographic, demographic, and economic boundaries.* (Growing and harvesting it is the right/smart thing to do.)
> **Axiom #2**: *Everyone can have meaningful and rewarding mathematical experiences.* (Mathematics needs users, fans, and ambassadors.)

This is a course designed to grow and harvest the talents that each of you have (and yes, each of you have mathematical talents and value, though these typically take different forms from person to person). In this course we will work collaboratively on meaningful and rewarding mathematical experiences through these experiences, we will deepen our abilities to serve as responsible citizens in society, to effectively use mathematics, and to enjoy mathematics and share that joy with the people around us. The central focus of our investigations will be Hyperbolic Geometry and the study of geometry from an axiomatic viewpoint. The discovery of a non-Euclidean geometry in the middle of the 19th century had a major impact on the study and development of mathematics that continues through today.

Mathematical Content Goals: Students in MA 391 will deepen their understanding of:

- geometry as an axiomatic system;
- the Poincaré disk model of the hyperbolic plane;
- the Poincaré half-plane model of the hyperbolic plane;
- Euclidean geometry theorems and their analogues in the hyperbolic plane;
- analytic hyperbolic geometry.

Mathematical Practice and Process Goals: Students in MA 391 will:

- enhance their reading, writing, and oral communication skills in mathematical contexts;
- increase their persistence and use of self-monitoring when working on mathematics;
- develop their critical analysis skills in the context of mathematical discourse;
- reflect on contemporary mathematical culture, their place in it, and their mathematical values.

Course Policy on Discourse Students are not allowed to make disparaging comments, at any time or for any reason, about themselves, their mathematical ability, their peers, or the abilities of their peers. Here are example statements that are prohibited, along with acceptable replacement phrases.

- I can't do this. $\rightarrow$ I am still learning how to do this.
- That was stupid. $\rightarrow$ That was a productive mistake.
- This is impossible. $\rightarrow$ There is something interesting and subtle in this problem.
- I'm an idiot. $\rightarrow$ This is going to take careful thought.
- I'll never understand this. $\rightarrow$ This might take me a long time and a lot of work to figure out.

- This is terrible. $\rightarrow$ I think I've done something incorrectly, let me check it again.

Please keep in mind the article by Carol Dweck from our course readings. The banned phrases represent having a fixed view of your own intelligence, which does not reflect the reality that you are all capable of dynamic, continued learning. The suggested replacement phrases support and represent having a growth mindset regarding your abilities and your capacity for improvement.

Grades: There will be five elements to assessment and grading in this course: Participation, Homework, Exams, Writing Projects, and a Presentation.

Participation:

- You must be present and engaged in class each day.
- You are expected to participate on the course discussion board.
- Your participation grade will be largely subjective. If you have any concerns, please talk with me about them as soon as possible.

Homework:

- Assignments will be given regularly.
- No late work will be accepted.
- You should work with other students and share your ideas as part of our course community. However, you should not let your collaboration devolve into letting someone else do all the "hard parts" and then copying their answers.
- Four Rules for Assignments:
    - Don't talk to anyone about the problems until you have made a genuine effort to solve them yourself.
    - You must write up the solutions on your own.
    - For each problem, write the names of any other people (students, tutors, etc) with whom you shared ideas.
    - You may not search the internet for solutions to problems. We will use our creativity, course texts, and peer collaboration as our tools.

Exams

- Exams will take place regularly.
- Exam dates will be listed on the course calendar in advance.
- The final exam will take place on Tuesday, 1 May 2018, at 3:30PM.

Writing Project 1

- You will write a critical analysis of the book *A Mathematician's Brain*. A detailed prompt for this assignment will be provided separately.
- You will turn in a first version of your project for peer review; the first version must be a complete project that you will revise substantially to create your final version.

Writing Project 2

- You will write an expository essay about a mathematical topic related to the course. A detailed prompt for this assignment will be provided separately.
- This project will include an information literacy assignment.
- You will turn in a first version of your project for peer review; the first version must be a complete project that you will revise substantially to create your final version.

Presentation

- Each student will give a 10 minute oral presentation summarizing the writing project that s/he has chosen. These will occur at the end of the semester.
- You will sign up for a presentation time through the scheduler on the UK Canvas system.

Course Grades Your course grade will be determined by our participation, assignments, exams, writing projects, and presentation.

- Participation: 5%
- Assignments: 25%
- Exams: 25%
- Writing Project #1
    - First Version: 5%
    - Final Version: 10%
- Writing Project #2
    - First Version: 5%
    - Final Version: 20%
- Presentation: 5%

Mid-term Grades: Mid-term grades will be posted on myUK by the deadline established in the Academic Calendar
(`http://www.uky.edu/Registrar/AcademicCalendar.htm`).

Course Policies:

- *Attendance*: Attend lectures and recitations regularly. Be on time and remain until dismissed. Do not leave in the middle of class. Instructors have the right to take off attendance points for coming late or leaving early. If you cannot come to lecture or recitation and would like to request an excused absence, inform the instructor as early as possible and provide documentation.
- *Unexcused Absences:* You are allowed 2 unexcused absences. Beyond that, you will lose 2% of your overall course grade for each unexcused absence.

- *Excused Absences:* Students need to notify the professor of absences prior to class when possible. Senate Rule 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.
  Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class.
- Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused) per University policy. Per Senate Rule 5.2.4.2, students missing any graded work due to an excused absence are responsible: for informing the Instructor of Record about their excused absence within one week following the period of the excused absence (except where prior notification is required); and for making up the missed work. The professor must give the student an opportunity to make up the work and/or the exams missed due to an excused absence, and shall do so, if feasible, during the semester in which the absence occurred.
- *Verification of Absences:* Students will be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence when feasible and in no case more than one week after the absence.
- Classes meet as usual on the days after an exam. Attendance rules apply as usual.
- Classes do meet as usual on Monday and Tuesday of Thanksgiving week. Attendance rules apply as usual.
- *Accommodations due to disability:* If you have a documented disability that requires academic accommodations, please see your instructor as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide the instructor with a Letter of Accommodation from the Disability Resource Center (Suite 407, Multidisciplinary Science Building, 725 Rose Street. Contact Susan Fogg, Disability Accommodations Consultant, drc@uky.edu, (859) 257-2754) for coordination of campus disability services available to students with disabilities.
- *Missed work* In order to be fair to all students, dates for exams and homework assignments are firm. It is very important to take each exam on schedule. Missed work may be made up only due to illness with medical documentation or for other unusual (documented) circumstances. If you have a university excused absence or a university-scheduled class conflict with uniform examinations please contact your lecturer as soon as possible, but at least 10 days before the exam, so that an alternate exam can be arranged for you.

- *Academic Dishonesty:* Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

  Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the website Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited. Senate Rules 6.3.1 (see Senate Rules for the current set of Senate Rules) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission. When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording, or content from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

  Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, computer code, or a paper from a friend) without clear attribution. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work, which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content, and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas, which are so generally and freely circulated as to be a part of the public domain.

  Students are encouraged to work together to understand a problem and to develop a solution. However, the solution you submit for credit must be your own work. In particular, you should submit your answers for web homework. Copying on exams and usage of books, notes, or communication devices during examinations is not allowed. Cheating or plagiarism is a serious offense, and it will not be tolerated.

Students are responsible for knowing the University policy on academic dishonesty. The following are a few examples of academic dishonesty

1. using someone else's clicker in class or asking someone to falsely use one's clicker in class;
2. sharing answers on an exam by texting or other messaging apps;
3. having another student complete an assignment for you or give you answers to specific questions;
4. using unauthorized materials or hardware on an exam;
5. looking at another student's answers during an exam;
6. having someone else take your exam for you;
7. lying about having taken an exam or completed an assignment.

- Be on time to class and remain until dismissed. Do not leave in the middle of class.
- *Accommodations due to disability*. If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (DRC). The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet Drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754 and via email at drc@uky.edu. Their web address is `http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/`.

Inclement Weather Policy: The University of Kentucky Severe Weather Policy can be found at `http://www.uky.edu/PR/News/severe_weather.htm`. The UK Infoline at (859) 257-5684, UK TV Cable Channel 16 and 19, or the UK Web site at www.uky.edu are the best places to find the most up-to-date situation.

If you feel that travel during inclement weather would be hazardous, then try to inform your instructor as soon as safely possible. You will be given the opportunity to make up any work missed or due on that day. As always, each student is responsible for any work missed and will be expected to get the notes from another student or from the web.