

Syllabus

Math 381

Spring '17

Text: none. You will have to learn new material from sources other than a textbook

Instructor: Jed Herman Office: SCI D 287 (x4188)

Office Hours: MT 12:00 – 12:50, WR 2:00-2:50

or by appointment (or whenever I'm in... just stop by!)

Class times & room: 4:00 – 4:50 MTR in Science D 228

What is Mathematical Research Methods:

The goal of a Mathematical Research Methods course is to teach you about, well, mathematical research. There several approaches to this – one is to read mathematical journals of recent theoretical work, reading bibliographies to see how new theorems and discoveries are inter-related. We will not use that approach.

Instead, we will look at mathematics used in business and industry. Industrial math involves real-life unsolved problems – usually problems with multiple ways to answer them. Rather than study problems like these from a purely theoretical approach, we will actually work on real problems. Our goal will be to provide solutions to different problems, from start to finish. This will involve brainstorming ideas, looking up new types of mathematics, learning to program (probably in R – a statistical language), presenting findings, and writing up a final report on the problem. Our first few problems will be designed to ease us into the ideas, leading to one bigger problem for about 2/3 of the semester.

Research like this involves team work. Your instructor will assign groups based on the relative abilities and work habits of each student. Because of this, attendance and *engagement* are significant course elements. More on this later.

Learning Outcomes:

Math 381 counts as both a Capstone and Communication in the Major for a Mathematics Major. As such, it has the following learning outcomes:

- Apply discipline-specific standards of communication to compose an articulate, grammatically correct, organized presentation and written work which is properly supported and documented, and is suitable to an appropriate audience
- Critique your own and others' writing/oral presentations to provide effective and useful feedback to improve communication skills
- Integrate knowledge, skills, and experience related to GEP Outcomes related to mathematics
- Demonstrate skills, processes, and resources needed to make a successful transition from college to the world beyond

Clearly, these are pretty open-ended outcomes. We will accomplish them all AND discover new mathematical results along the way.

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Calculators:

For this course we will be more concerned with mathematical IDEAS than mathematical FORMULAS or COMPUTATIONS, so for much of the course calculators will not be necessary. Your smart phone probably has a good enough calculator for much of the work we will do this semester! Of course you won't be able to use it on exams – but your instructor will provide some calculators to borrow on exam days.

Rough Schedule:

Here is a very rough schedule of the course:

Work on first problem	about 1.5 weeks
Work on second problem	about 1.5 weeks
Work on third problem	about 2 weeks
Lectures on fourth idea	about 1 week
Exam on material from these problems	March 2
Become acquainted with main problem	about 1 week
Work on main problem	about 8 weeks
Main Presentation of Results	May 11 and May 16
Exam (mostly on main problems)	only if we need it
Written Report	May 15 (a day earlier than the scheduled final)

Homework:

The main purpose of this course is to hone original ideas into discovery, so homework is not a prime focus. That said, we will learn new techniques that you will need to master – so there WILL be some homework assignments. Typically, assignments will be due on Mondays or Exam days, and you will have between 1 and 2 weeks to complete them.

Projects:

Each project will have a final presentation as well as a written report. Typically, the rest of the class – and the instructor – will provide feedback on presentations; grades, however, will almost always be assigned only by the instructor. Because team projects require each individual to work hard, there will also be components which measure relative contributions of each team member.

Since the main problem lasts much longer, it will also require bi-weekly updates – presentations and written reports – so that the instructor can continue to monitor progress.

Exams

There are one or two exams for this course. The first is to assess mastery of the techniques we will cover in the first half of the course. I have not listed a second exam, because there is no guarantee we will cover enough new material to warrant one. If we do, I will schedule it. There is no final for this course, but there are a written report and final presentation due.

Attendance and Engagement:

Team meetings will frequently be held in class – so class attendance is mandatory. More than simply being there, however, students will be expected to be contributing to the project during meetings.

Of course, real life is messy, so sometimes things can come up which make you miss a class or two. If you have to miss a class period, let your team members and instructor know ahead of time (email is a good way, so is D2L).

Missing exams and/or presentation days, on the other hand, will only be allowed for extreme circumstances and will require DOCUMENTATION (so for example, if you are too sick to take an exam the instructor will need a note from a medical professional). Whenever possible, you will need to let your instructor know BEFORE the day in question.

D2L Storage and Homework Boards

D2L will serve as a storage space for course content. That way, you can easily get access to them if you miss them. More importantly, you will also have a discussion board available for your group, to post back and forth. You can use email instead if you want, but if you use email to communicate with your group then try to include the instructor's email in the cc section, so the instructor has a record of the communication.

The boards will be monitored after the fact. That is, you will post directly to the board, and I will monitor (semi-weekly). Postings (and email messages) are never anonymous and must not contain inappropriate (foul, rude, hostile) language. Violation of this rule may constitute academic misconduct (see below).

The instructor will check all boards at least once every 24 hours (except maybe on the weekends).

D2L Dropbox

The goal (at least for now) is to have all written reports submitted via dropbox on D2L. This may or may not work well – we will have to evaluate the idea as the semester progresses.

Student Rights and Responsibilities

You have certain rights and responsibilities. For more information, see the following link: <http://www.uwsp.edu/admin/stuaffairs/rights/rightsCommBillRights.pdf>

Disabilities

Information concerning accommodations made as per Section 504 of the Rehabilitation Act or the Americans with Disabilities Act can be found at <http://www.uwsp.edu/admin/stuaffairs/rights/rightsADAPolicyInfo.pdf>

In particular, to request any accommodations of this type, relevant to this class, you should discuss the matter with the Disability Services Office. Information and contact information may be found at <http://www.uwsp.edu/special/disability/>

Academic Misconduct Policy

I expect you to complete the coursework for this course. Failure to complete an assignment will result in zero points awarded for that assignment. Late assignments may lose points, at the discretion of the instructor. Also see the following link:

<http://www.uwsp.edu/admin/stuaffairs/rights/rightsChap14.pdf>

VERY IMPORTANT: the purpose of this course is to create new mathematics and present it. During the semester you will be EXPECTED to do research on topics and ideas – sometimes by literature searches, sometimes by web searches (Google, anyone?). There is a difference between searching to learn background and searching to find someone else's answer to a question or problem. DO NOT SEARCH FOR ANSWERS. Writing up someone else's (not in your group) work and not citing it is plagiarism, and plagiarism is a very serious academic misconduct. YOUR INSTRUCTOR WILL PENALIZE PLAGIARISM VERY HARSHLY (POTENTIALLY EVEN EARNING YOU AN F IN THE COURSE). The take-away should be this: do not do it. If you have any doubts, ASK.

Grading:

Grading is typically one of the first things in a syllabus, but it is last here for a reason: the course is not about adding points to get a grade. It is about producing mathematical work and communicating that work.

That said, grades are important. Individual components will earn letter grades (in a few cases they will earn points); these will be weighted roughly according to the following weights:

<u>Early Projects (50%)</u>		<u>Main Project (50%)</u>	
Homework Assignments	10%	Homework	10%
Participation and Engagement	10%	Participate/Engage	10%
Exam	10%	Bi-Weekly Presentations	
Presentations and Reports	10%	and Reports*	10%
Peer Assessment	10%	Final Presentation	10%
		Final Report	10%

* Note that peer assessment is built into the bi-weekly reports