Math 10460 - Honors Mathematics II
Course Syllabus
Spring 2016

Lecture.

Instructor	:	Edward Burkard
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Office	:	Hurley 295
Class Time	:	MWF 9:25-10:15
Class Location	:	Hayes-Healy 229
Office Hours	:	Sun 19:00-20:30, Tues 17:00-18:30 and by appointment
Course Webpage	:	http://www3.nd.edu/∼eburkard/?page=Teaching/10460S16

Tutorial.

Section 11.	TA	:	Angela Adduci
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	Class Time	:	T 9:30-10:20
	Class Location	:	DeBartolo 241
Section 12.	TA	:	Hannah Porter
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	Class Time	:	T 11:00-11:50
	Class Location	:	O'Shaughnessy 204

1. Course Description

This course will be a topics course of sorts. We will begin with an extensive study of polar coordinates with a view towards Kepler's 3 laws of planetary motion. This will involve studying conic sections in polar coordinates. In the second unit, we will study symmetry and geometry. We will study symmetries of shapes and of the whole plane as well as other transformations of the plane. Finally, we will end with a study of topology. Topics include the Euler characteristic, classification of surfaces, and possibly knots.

2. Prerequisites (Now null)

Some familiarity with differential and integral calculus will be assumed. Familiarity with vector operations such as dot and cross product will be helpful, but not necessary. Everything beyond differential and integral calculus which is required will be covered in class as necessary.

3. Grade

Your grade will be determined as follows:

Item	Homework	Quizzes	Exams	Final	Projects	Attendance
Percentage	24%	18%	33%	12%	9%	4%

Your grade will be determined by the percentage of the total points you've obtained. The grade scale will be no stricter than

Letter	A	B	C	D	F
Cutoff	92%	82%	72%	57%	0%

with +'s and −'s to be used as needed for the final grade only. Throughout the semester, there will be 2 or 3 "Math for Everyone" lectures. If you attend the lecture and write up a brief summary of the lecture, you will receive 0.5% extra credit towards your course grade.

4. Textbook

The only required book for this class is "The Calculus Wars" by Jason Socrates Bardi. We will use this later in the course for an essay, which details will be given for later. The "Basic Calculus" by Alexander Hahn is optional and meant to serve as a reference for calculus. You can really use any calculus text though. I may occasionally refer to this text as a reference, but not in any critical way. I will also pass out the occasional packet containing material we will cover.

5. Course Structure

There will be 3 major units to this class: the polar unit, the geometry unit, and the topology unit. The polar unit will take approximately 6 weeks, the geometry unit will take approximately 5 weeks, and the topology unit will fill the remainder of the time, about 4 weeks.

6. Attendance

Attendance in the class is mandatory and worth 4% of your course grade. 3 unexcused absences will forfeit this 4%, and every further unexcused absence will forfeit a further 2% of your course grade. Officially excused absences will not count against your grade, but you should put in an effort to make up for any missed classes, whether it be talking with your classmates, TAs, or myself.

7. Exams

Exams will be given at the end of a unit of study. As there are 3 units, there will be three exams. Each exam will be worth 11% of your course grade. Approximate dates for these exams are February 22nd, March 30th, and April 25th. These dates are approximate as the time taken to cover all of the material may vary from the estimates (they are now all official!). Official dates for the exam will be given at least 1 week before the exam. The final for the class will be an essay based off of the required book for the class. Vaguely, the topic is on Sir Isaac Newton, Gottfried Wilhelm Leibniz, and the development of calculus. A hard copy of the essay will be due in my mailbox on Wednesday, May 4th by 10am. The final essay is worth 12% of your final grade.

Exam make ups will only be given with an excuse from the appropriate campus personnel. Anyone who misses an exam and does not have an appropriate excuse will receive a 0 for that exam. Travel plans, sleeping in, defective alarm clocks, etc. ARE NOT a valid excuse for missing an exam. If you have a valid excuse (illness, excused athletic absence, etc.) for missing an exam, please contact me ASAP (preferably before the exam) and a makeup exam will be scheduled.

8. Quizzes

Roughly every week, there will be a 10-minute quiz at the beginning of class on Wednesday. I expect to give 10 quizzes throughout the semester, each worth 2% of the final grade. The quizzes will cover the material from the previous week of class. The lowest quiz grade will be dropped. Policies for missing a quiz are the same as for missing an exam.

9. Homework

Homework will be assigned daily and will be due the Wednesday after it is assigned. I expect there to be 12 homework assignments due throughout the semester, and each one will be worth 2% of your final grade. No homework scores will be dropped. The daily assignments will not be too large, but the idea is to keep you working to help you not fall behind in the class. Late homework without an appropriate excuse will be accepted, but at a 10% reduction in grade for every day it is late will be applied (e.g., 2 days late = 20% of score removed).

As last semester, you will be broken into groups, and each group will submit one document to be graded. I encourage you to work together on the homework in your groups and to come to me or the TAs as needed for help. You may also discuss problems with other students in the class, but I strongly recommend you to work with your group as much as you can and "struggle" through the exercises to help develop a better understanding of the material.

10. Projects

My plan is to give a project for each unit which encourages deeper understanding of the ideas in that unit. Each project will be worth 3% of your course grade. The project for the polar unit will involve Spirographs. Information for the other projects will be given later in the semester. Due dates for projects are the exam dates.

11. Mathematical Software

Frequently in class I will use the software *Mathematica* to create visuals of various concepts. Furthermore, Mathematica will be necessary for the first class project involving Spirographs. A free copy of Mathematica is available to you through the OIT website:

oit.nd.edu/software-downloads/mathematica/

This requires that you log in with your netID. Alternatively, I believe that campus computers are equipped with Mathematica, so you can use those instead of installing the program on your computer.

12. Honor Code

As members of the Notre Dame community, we will not tolerate academic dishonesty. The Honor Code is in effect for all exams. Students will not give or receive aid on exams. This includes, but is not limited to, viewing the exams of others, sharing answers with others, and using books or notes while taking the exam. You may not talk about an exam to anyone who has not already taken it until the answers are posted on the website. This includes people who are not taking the course! Violations will not be tolerated and will be prosecuted! Please see the above section on homework for details about the Honor Code relating to homework. You can find more about the Honor Code here: honorcode.nd.edu

13. Conduct

You are expected to act in a respectable manner. If you are disruptive, you will be asked to leave, and you will forfeit your attendance points for the day. If you have a cell phone, please turn it off (or at least place it on silent) during class time. Lectures being interrupted by cell phones going off is disrespectful and extremely annoying.

Material in the syllabus is tentative, and I reserve the right to change any information in this syllabus in the event of an unforeseen event.