

# Syllabus Slides for Math 111

## Techniques of Calculus II

Instructor:  
Sara Jamshidi

January 13, 2015

# BASIC INFORMATION

# Course Information

- ▶ **Section:** 01
  - ▶ **Course Number:** 405616
  - ▶ **Class Time:** TR 10:10 AM - 11:00 AM
  - ▶ **Location:** 110 Osmond Lab
- ▶ **Section:** 02
  - ▶ **Course Number:** 405619
  - ▶ **Class Time:** TR 1:25 PM - 2:15 PM
  - ▶ **Location:** 106 Osmond Lab
- ▶ **Instructor:** Sara Jamshidi
- ▶ **Prerequisite:** Math 110, or equivalent
- ▶ **Text:** No Textbook

## Course Information: Material

Much of the course material will come from the following textbooks. You are not obligated to purchase them.

- ▶ Schaufele, C., & Zumoff, N. (1993). *Earth algebra: College algebra with applications to environmental issues* (2nd ed.). New York: HarperCollins College.
- ▶ Smith, D., & Moore, L. (1996). *Calculus: Modeling and application*. Lexington, Mass.: D.C. Heath.
- ▶ Hallett, D., & Lock, P. (2014). *Applied calculus* (5th ed.).

# Instructor Information

**Sara Jamshidi** (jam-SHEE-dee)

- ▶ **Office:** McAllister Bldg 419
- ▶ **E-mail:** jamshidi@math.psu.edu
- ▶ **Office Phone:** (814) 863-9049
- ▶ **Office Hours:** T 2:30 - 3:30pm or by appointment
- ▶ **Piazza “Office” Hours:** MW 4:30pm - 5:30pm

## Piazza “Office” Hours

- ▶ Piazza is a message board where you can post questions *any time*.
- ▶ I will log on during MW 4:30pm - 5:30pm (and perhaps other times) to answer any questions.
- ▶ You can post a question by
  - ▶ Clicking on the “New Post”
  - ▶ **Post to** Entire Class
  - ▶ **Select Folder(s)** based on what assignments the question relates
  - ▶ The **Summary** should briefly state your question.
  - ▶ In the details portion, write out your question. You can insert screen shots, photos and/or scanned images. You can also write using math symbols by clicking on the equation editor button “ $f_x$ .”

# COURSE GOALS, OBJECTIVES & TOPICS

## About This Course

**Course Description:** This course will use topics you've learned from algebra and calculus to determine (sometimes from raw data) optimized solutions important to ecology and economics—like ecological yield, maximum sustainable yield and optimum sustainable yield. Below is a tentative schedule of topics.

Introduction & Review .....	1/13 - 1/15
Systems of Linear Equations; Matrices; Vectors ...	1/20 - 1/27
Best Fit Functions and Raw Data .....	1/29
Stocks and Flows; Derivatives .....	2/3 - 2/10
Partial Derivatives, Gradients & Topography .....	2/10 - 2/19
Calculus-based Optimization .....	2/24 - 3/5
Lagrange Multipliers .....	3/17 - 3/24
Ordinary Differential Equations .....	3/26 - 4/9
Systems of ODEs (Predator-Prey) .....	4/13 - 4/23
Review .....	4/28 - 4/30



# Course Goals

Students will

- ▶ find a possible best-fit functions for a given data set and explain the strengths and weaknesses of such an approximation;
- ▶ identify relevant information using (partial) derivatives and (double) integrals;
- ▶ recognize and solve real-life optimization problems (maxima and minima) in one or more variables;
- ▶ use numerical methods to approximate optimum solutions;
- ▶ recognize and classify ordinary differential equations and know how to solve them (or approximate a solution);
- ▶ and recognize systems of ordinary differential equations and determine equilibrium point(s).

## Course Objectives

- ▶ Goals are the “big picture” aims of this class.
- ▶ Objectives are the smaller aims that allow us to achieve those goals.
- ▶ A list of the main objectives are at the end of the syllabus.
- ▶ I will also list the appropriate objectives at the beginning of every lecture.

# COURSE PHILOSOPHY ON LEARNING

# Course Philosophy – Language

Here are some of my beliefs about math:

1. Mathematics is the formalization of quantitative problem solving.
2. We are all natural problem solvers.
3. It's the *formalization* that makes math hard.

In this sense, math is like a language.

- ▶ Study math like you would a language
  - ▶ Practice daily
  - ▶ Understand terminology
  - ▶ Review! Review! Review!

## Course Philosophy - Activity

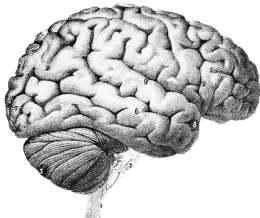
I also think math is more than a language:

1. Math is sometimes done under a time limit
2. Math is required to be accurate and precise
3. Math is expected to be presented clearly

The quickness and meticulousness required in mathematics makes learning the subject similar to learning a sport.

- ▶ Learn math like it is a sport.
  - ▶ Practice daily
  - ▶ Perfect how you do it  
(i.e. check your work, think about ways to do it better)
  - ▶ Take care of your mind like it is a muscle  
(i.e. sleep, eat well, do fun things, challenge yourself)

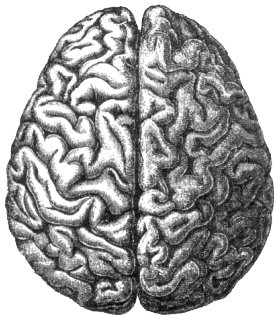
## Course Philosophy – Research



- ▶ **Learning Changes the Brain.** New neurons and connections between neurons form in response to that new information. The brain responds physically, chemically and functionally to everything we think and do.
- ▶ **Mistakes are Important to Learning.** When you make a mistake and reflect, you learn the concept *better* than you if you got it right the first time! Make mistakes and share them; they are learning opportunities.

## Course Philosophy – Research

- ▶ **Learning Takes Time.** Ideas are neural patterns in the brain. To really learn an idea, your brain needs to form and practice those patterns. The best way to learn something is to do it regularly throughout the week. No cramming!
- ▶ **Explaining Concepts is the Best Practice.** When you explain a concept in your own words, you learn the ideas in a richer and lasting way.



# Course Philosophy – Conclusions

- ▶ My conclusions:
  - ▶ **If We Both Work, You Will Learn This Material.** If you have the regular practice and guidance you need, you will learn the material. I will do my best to provide you with all the necessary resources.
  - ▶ **We Need a Welcoming Environment.** We want a welcoming environment where we can all work together to think problems through. If we share mistakes, we will all learn the material better. If we explain our thinking, we learn everything better.



# Course Philosophy - Execution

With this in mind, the course is structured so that

- ▶ we learn in manageable chunks,
- ▶ we practice immediately and consistently,
- ▶ we review previous material as time allows,
- ▶ we will emphasize neatness and clarity in our written work (to push us to communicate better), and
- ▶ feedback is given as soon as possible so opportunities for improvement can be utilized.

# COURSE STRUCTURE

# Quizzes

- ▶ The quizzes are essential to this course.
- ▶ It will be assigned at the end of **every lecture**.
- ▶ The quizzes are due 1pm on the day of the following lecture.
  - ▶ No late quizzes will be accepted.
  - ▶ Your three lowest quizzes will be dropped
- ▶ Quizzes can be taken up to 3 times before the due date.
- ▶ Each quiz is worth 4 points.

# Homework

- ▶ Five homework assignments will be given this semester, each worth 20 points.
- ▶ This assignments should be treated as lab reports. You will be given data and asked to determine various features of the data based on our work in the class.
- ▶ You are encouraged to work in groups, but you must write everything in your own words.
- ▶ Your homework should be neatly written or typed with the appropriate graphics to describe your work. They should be treated as professional projects.
  - ▶ No late homework will be accepted.
  - ▶ Homework is to be turned in on Angel.
- ▶ The homeworks are representative of the exams in this class.
- ▶ A rubric will be provided with the first assignment.

# Exams

- ▶ Exams in this class will be designed to mimic the real world. You will be allowed to use the internet or your calculator (although they shouldn't be necessary).
- ▶ Each student will be given a unique problem set and asked to figure out various things (based on what we've learned up to that point).
- ▶ Although you may use your phone for internet, you are asked not to text/call/email anyone nor take a photo of your exam.
- ▶ The final exam will work in much the same way. It will be cumulative.
- ▶ The homework assignments will be good practice for these exams.

# Attendance Policy

- ▶ Attendance is required for this class.
  - ▶ PollEverywhere will be the tool I use for determining attendance.
- ▶ Participation is necessary for this class and, as a result, your presence is crucial to the course.
- ▶ You will be held responsible for all work covered in this course.
- ▶ It is university policy that students attend every class for which the student is scheduled.

*A student whose irregular attendance causes him or her, in the judgment of the instructor, to become deficient scholastically, may run the risk of receiving a failing grade or receiving a lower grade than the student might have secured had the student been in regular attendance (Policy 42-27).*

# Grade Point Breakdown

**Grade Policy:** Points (450 total) are distributed as follows

100 points	quizzes (4 pts each)
100 points	homework (20 pts each)
100 points	midterm
150 points	<u>comprehensive</u> final examination

**Grading:** Final grades are guaranteed to be at least...

A	415-450 pts	B	370-394 pts	C	315-349 pts
A-	405-414 pts	B-	360-369 pts	D	270-314 pts
B+	395-404 pts	C+	350-359 pts	F	0-269 pts

# FINAL THOUGHTS



# Homework Help

- ▶ Talking problems out is one of the **\*BEST\*** things you can do to help you learn math. I highly recommend:
  1. Form study groups; make friends!
  2. Visit office hours
  3. Post questions on Piazza

## Disability Access Statement

Penn State welcomes students with disabilities into the University's educational programs. The Office for Disability Services (ODS) Web site provides contact information for every Penn State campus: <http://equity.psu.edu/ods/dc1>. For further information, please visit the Office for Disability Services Web site: <http://equity.psu.edu/ods>.

In order to receive consideration for reasonable accommodations, you must contact the disability services office, participate in an intake interview, and provide documentation: <http://equity.psu.edu/ods/guidelines>. If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with me ASAP. You must follow this process for every semester that you request accommodations.

# Academic Integrity Statement

Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. All University policies regarding academic integrity apply to this course.

Academic dishonesty includes, but is not limited to, cheating, plagiarizing, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. All exam answers must be your own, and you must not provide any assistance to other students during exams.

Any instances of academic dishonesty WILL be pursued under the University and Eberly College of Science regulations concerning academic integrity.

## When In Doubt...

Talk to me as soon as possible.

No matter how small your difficulties may seem, I am willing to work with you.

I want everyone in this class to succeed. **Everyone.**

Help me with my goal by

- ▶ being committed to your own success,  
(make time for your work)
- ▶ being committed to the success of your classmates,  
(share ideas and mistakes)
- ▶ keeping perspective.  
(this is just one class, don't get too stressed out)