

Elements of Calculus and Statistics
MATH 209, Section CD2, Spring 2015
M, W 12pm – 1:40pm in NAC 6/114

Instructor: Jhevon Smith. (“Jhevon” is fine.)

Email: JhevonTeaches@gmail.com

Office Hours: By appointment only.

Website: http://math.sci.ccny.cuny.edu/people?name=Jhevon_Smith

Text: Grossman, E., Mathematical Methods for the Life Sciences. You can obtain this text from the math department. The cost is roughly \$5.

Math Dept.: NAC 8/133 **Math Dept. website:** <http://math.sci.ccny.cuny.edu>

Math 209 website: http://math.sci.ccny.cuny.edu/courses?name=Math_20900

Websites: I gave you my website since I will be posting documents and instructions for the class there, such as: review problems, announcements, solutions to tests and quizzes, etc. I gave you the math 209 website because you will need to go to that website to access things like past finals, instructions for Excel and preprogramed Excel files. I gave you the math. dept. website because, well, you should have it.

Calculator: Scientific calculators are not only permitted, they are required for the course. Bring your calculator to every class. It must have the square root function ($\sqrt{\quad}$) and exponential keys (y^x) and probability functions (factorials, combinations, permutations). *You are NOT allowed to use your smart phone as a calculator.* I do not recommend that you use graphing calculators. If you do, then I will have to wipe its memory before every test or quiz. This inconveniences everyone. An adequate non-graphing scientific calculator should be affordable to virtually everyone.

Grading: Grades will be assigned according to the following chart.

Letter Grade	G.P.A.	Grade	Letter grade	G.P.A.	Grade
A ⁺	4.00	97-100	C+	2.33	77 - 79
A	4.00	94-96	C	2.00	70-76
A ⁻	3.66	90-93	D	1.00	60-69
B ⁺	3.33	87-89	F	0	Below 60
B	3.00	84-86			
B-	2.66	80-83			

As department policy demands, the final exam is worth 40% of your grade in this course. The remaining 60% will come from your in-class grade; the breakdown of your numerical grade will be as follows:

Quizzes: 15% (In general, you will have one quiz per week—I’ll drop the worst two).

Homeworks: 5% (I will drop the worst two).

Participation: 5% (Based mostly on attendance).

Excel HW: 5% (You will submit electronic and printed copies, none will be dropped).

In-class tests: 30% (I plan on giving 4 exams and will count the best 3).

Final Exam: 40% (This will be a cumulative exam given at the end of the course).

Extra Credit: Not happening...

Make-up Exams/Quizzes: No way...

Attendance: Attendance will be taken at the beginning of class. You are *late* if you arrive after your name is called. If you are late twice, that is considered as one absence. I will deduct 2^{n-2} points, where n is the number of times you are absent, $1 < n < 5$. You will be assigned a WU (failing) grade if you accumulate 5 unexcused absences.

To be excused for an absence (or lateness) you must email me no later than one day after that particular absence (or lateness) with the reason. Of course, proof is required where applicable. For example, if your absence or lateness was due to a doctor's appointment, I expect to see a doctor's note. If you miss a class, it is your responsibility to catch up. You can see me during my office hour to discuss what was done in class, or catch up on your own. It's up to you. **To reiterate, there is no make-up for a missed quiz/homework/exam. Seriously! I drop your lowest scores to make up for the fact that there are no make ups.**

My Expectations:

Work ethic: You are not to slack off (more on this in class)! You are to read ahead! Very Important! Read each section before coming to class. It's better if you have your mind working on the concepts before coming to class—it will be easier for you to keep up and ask intelligent questions.

Homework: Assigned homework will be collected at the beginning of the class when it's due. We will review each homework in class, so be prepared to discuss your attempts and ask questions. The homework for a section is due once I complete that section in class (whether I announced that I completed it or not. Ask me if you're not sure, or follow along in the text). **Late homework will NOT be accepted.** The excuse does not matter. I will drop two homeworks to make up for the fact that late ones cannot be handed in.

I expect your hand-in homework to follow certain guidelines (**you lose points otherwise**):

- (1) Show all your work. This goes for homework and *everything* else you do in this class. If anything at all can be written down to show how you got from point A to B, then write it!
- (2) Your homework must be stapled if it consists of more than one page.
- (3) Your homework must be properly labeled: **Your name, the HW number and topic(s)** (see the syllabus for what these are).
- (4) Only ONE HW number per stapled group.
- (5) Be neat! And write legibly, for Pete's sake!

I also expect you to remember the math that you have done before this course. In particular, I expect you to remember your calculus I. I also expect you to be familiar with exponentials and logarithms and the calculus involving them (if you took math 201 instead of 205, then you did not cover these topics, you need to cover them on your own—quickly). I will assume you are all experts at the lower level math courses. If this is not currently true for you, make it true, quickly; like by the end of the week.

Now, the matra.

Repeat the following to yourself 10 times a day. Five times when you wake up and five times before you go to sleep.

*I must NOT cancel across sums,
I must NOT distribute powers across sums,
I must NOT divide by zero,
All these are blasphemy!
But I will use brackets when appropriate.*

So yeah, the above may seem like a joke, and it is somewhat, but here's the part that's not funny: **do NOT commit any of the blasphemies mentioned above! Doing so will result in an instant zero (0) on any exam or quiz in which such an offense is made! Regardless of how well you did otherwise.**

There are other offenses that will incur a similar penalty. Making any one of the following mistakes will result in you getting a zero for the problem you make the mistake in.

- 1) Making the mistake of thinking $\int 1/x^n dx = \ln(x^n) + C$ (this is NOT true unless $n = 1$!!!)
- 2) Making the mistake of thinking the derivative (or integral) of a product (or quotient) is just the product (or quotient) of the derivatives (or integrals). That sounded confusing, I'll explain this in class.
- 3) Making the mistake of giving a probability value outside of 0 and 1.
- 4) Making the mistake of giving a correlation coefficient value outside of -1 and 1.

Avoid these mistakes at all costs. I will punish you severely for making them.

Contact: You are to email me at the end of the first day of class, stating your name, your course and its section. I will deduct 5 points off your final grade if you fail to do this. I will be emailing important information from time to time; including progress reports, announcements and advice as needed. Please read the emails. If I email you, it means it is important—important enough for me to take the time to write an email so that you will have it in writing.

Feedback: I encourage you to give me feedback about my teaching or the class, whether positive or negative (just make it constructive please). You can email me or talk to me, or if you don't want to reveal your identity, there is an anonymous feedback page on my website.

Help: FREE tutoring is available in the Marshak Building, room 418S. I am also a tutor there. The hours for this semester are: Mondays through Thursdays 12pm – 5pm and Fridays 12pm – 4pm. There are also online resources available. A great place to get math help, even at odd hours, is www.mathhelpforum.com. There are a significant number of brilliant people from varying time zones who decide to spend their free time helping others with math. Take advantage of this great service. Another great resource on the web is wolframalpha.com. You can use that site to check your answers. Brilliant site. Of course, there are other online contenders like YouTube, Khan Academy, etc. Check them out. And don't forget your classmates. You should get the contact information of at least one person that you can study with or get missed notes from if you are absent, etc. You're all in this together, help each other out. And, of course, there is always me! Don't be afraid to come to me if you have questions or concerns. You can contact me via email or see me after class or during my office hour.

Some class rules: Please silence your cell phones and don't use them when in class. Eating in class is NOT allowed. Drinking is permitted, as long as you remove your garbage afterwards.

Academic Integrity: Any act of academic dishonesty will be dealt with by applying the most stringent penalties permitted. Cheating includes, but is not limited to, receiving help during exams and submitting homework without properly acknowledging persons who assisted you. Please read carefully the Policy on Academic Integrity posted on the CUNY website with URL http://www1.cuny.edu/portal_ur/content/2004/policies/image/policy.pdf

I really don't like cheating. Please don't do it. There, I asked nicely.

Spring 2015 Academic Calendar

January

01/20/2015 Last day to apply for an e-permit

01/27/2015 Last day for 100% tuition refund

01/27/2015 Last day of Registration

01/28/2015 CLASSES BEGIN

01/27/2015 –
01/30/2015 Change of Program

01/31/2015 FIRST DAY OF SATURDAY CLASSES

February

02/02/2015 –
02/03/2015 Change of Program

02/03/2015 Last day to file for Pass/Fail and Audit Options

02/03/2015 Last day to add a class to an Existing Program

02/03/2015 Last day to drop classes for 75% tuition refund

02/10/2015 Last day to drop classes for 50% tuition refund

02/12/2015 COLLEGE CLOSED - Lincoln's Birthday

02/16/2015 COLLEGE CLOSED - President's Day

02/17/2015 Last Day to drop classes for 25% tuition refund

02/17/2015 Last day to drop classes without the grade of "W"

02/18/2015 Course withdrawal period begins (A grade of "W" is assigned to students who officially drop a class) – No Refund

02/18/2015 Monday Schedule

2/18/2015 Verification of Enrollment begins

02/26/2015 Last day to submit proof of immunization for NYS residents

02/26/2015 Verification of Enrollment due to Registrar for assignment of WN grades

March

03/02/2015 Deadline for filing Application for Degree for May 2015 graduation.

03/05/2015 Last day to select a major for this semester's TAP awards

03/13/2015 Last day to submit proof of immunization for non-NYS Residents

03/15/2015 FAFSA priority deadline for 2015 – 2016 financial aid

April

04/03/2015 –
04/11/2015 Spring recess (College Open)

04/08/2015 INC grades for Fall 2014 for Undergraduate students convert to FIN

04/08/2015 INC grades for Spring 2014 for Graduate students convert to FIN

04/16/2015 Course withdrawal period ends, last day to drop with the grade of "W"

May

05/15/2015	LAST DAY OF CLASSES
05/16/2015	LAST DAY OF SATURDAY CLASSES
05/17/2015	Reading Day
05/18/2015 – 05/24/2015	Final Exams
05/24/2015	End of Spring Term
05/25/2015	COLLEGE CLOSED - Memorial Day
05/28/2015	Last day for grade submissions for Spring 2015
05/29/2015	Commencement

June

06/01/2015	Summer Session Begins
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Topics and Assignments:

HW #	Section	Topic	Problems to do
1	1.1- 1.2	Differentiation & Integration (mostly review)	1.4 Exercises: 1 - 37 all
2	Appendix A	Introduction to Excel	A.5 Exercises: 4, 5, 6, 8, 9, 10, 11
3	2.1 – 2.2	Intro. to ordinary differential equations, separation of variables	2.5 Exercises: 1 - 15 odd
4	2.3	Exponential growth	2.5 Exercises: 17, 19, 22, 23, 25
5	3.1-3.3	Euler's Method and Modified Euler's Method	3.6 Exercises: 1 - 11 odd, 13(a), 15, 17 - 19 all
*	Test #1	Covers chapters 1 through 3	Given in class
*	4.1 – 4.2	Steady state solutions of autonomous ODEs	Covered by HW 6
*	4.3	Geometric analysis	Covered by HW 6
6	4.4	Stability	1 - 33 odd
7	5.1 – 5.2	Malthus model, harvesting	5.5 Exercises: 1, 3, 5, 6, 7, 14
8	5.3	Logistic model	5.5 Exercises: 9, 11, 12, 13, 15
9	6.1- 6.2	Intro to systems of ODEs; competition models	6.8 Exercises: 1 - 4 all
10	6.3	Steady States & Phase Plots	6.8 Exercises: 5 - 7 all
11	6.4 – 6.5	Stability, null-clines; applications to epidemics	6.8 Exercises: 8, 9, 12, 14, 15, 19(a)-(c)
*	Test #2	Covers chapters 4 through 6	Given in class
12	7.1 – 7.2	Histograms	7.9 Exercises: 1, 3
13	7.3 – 7.4	Measures of centrality and spread	7.9 Exercises: 5, 9, 13, 15, 19
14	7.5 – 7.6	Box plots & estimation	7.9 Exercises: 11, 17, 21, 23, 26, 28
15	8.1 – 8.3	Scatter plots, correlation coefficient	8.7 Exercises: 1 - 9 odd, 15
16	9.1 – 9.2	Method of least squares	9.9 Exercises: 1, 3, 5, 9, 15
17	9.3	Prediction	9.9 Exercises: 7, 16
*	10.1 – 10.2	Intro. to Probability	Covered by HW 18
*	10.3 – 10.4	Classical probability, counting	Covered by HW 18
18	10.5	Probability rules	10.7 Exercises: 1 - 17 odd, 12, 18
*	11.1	$P(A \text{ or } B)$	Covered by HW 19
19	11.2	Independence	11.5 Exercises: 1 - 11 odd, 15
20	11.3	Conditional probability & Bayes' Theorem	11.5 Exercises: 13
*	Test #3	Covers chapters 7 through 11	Given in class
21	13.1 – 13.2	Discrete Random variables	13.7 Exercises: 1, 2, 3, 5, 6,
22	13.3	Binomial distribution	13.7 Exercises: 9, 11, 12, 15, 18, 19
23	13.4	Poisson distribution	13.7 Exercises: 13
24	14.1 – 14.2	Continuous random variables; uniform distribution	14.8 Exercises: 1, 4
25	14.3	Standard normal distribution	14.8 Exercises: 5, 8
26	14.4	Normal distributions	14.8 Exercises: 6, 13, 15, 17
27	14.5	Normal approximation to the binomial distribution	14.8 Exercises: 7, 9, 11
*	15.1 – 15.3	Statistical Inference – confidence intervals	We're skipping this! But I might mention a few things about it if we have time
*	Test #4	Covers chapters 13 through 14	Given in class
*	Final Exam (Cumulative)	Thursday, May 21 from 3:30pm to 5:45pm	Location and seating assignments TBA

Your real first assignment is to email me, as in the “Contact” instructions above.

COURSE LEARNING OUTCOMES

DEPARTMENT:

Mathematics

<p>COURSE #: 20900 COURSE TITLE: Elements of Calculus and Statistics CATEGORY: TERM OFFERED: Spring 2015 PRE-REQUISITES: Math 20500 or departmental permission PRE/CO-REQUISITES: HOURS/CREDITS: 4hrs/4credits DATE EFFECTIVE:1/23/07 COURSE COORDINATOR: E. Grossman</p>	<p>CATALOG DESCRIPTION : Introduction to differential equations including numerical methods; qualitative analysis of solutions; phase plane analysis for systems; biological applications; analysis of univariate and bivariate data; regression and correlation; random variables; the normal, Poisson and binomial distributions; statistical inference. A spreadsheet program such as <i>Excel</i> is used throughout the course.</p> <p>Suggested Text: <i>Mathematical Methods for the Life Sciences</i>, by Grossman, CCNY publ.</p>
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COURSE LEARNING OUTCOMES

Please describe below all learning outcomes of the course, and indicate the letter(s) of the corresponding Departmental Learning Outcome(s) (see list at bottom) in the column at right.

After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):
1. Use separation of variables to solve a differential equation.	a
2. Use a phase diagram to understand the qualitative behavior of a single autonomous differential equation.	a, b, d
3. Understand a phase plot for an autonomous system and relate its properties to the time plot of the solutions.	a, b, d
4. Demonstrate an understanding of how a differential equation is solved numerically and analyze properties of the solution from the output.	a, b, d
5. Formulate and analyze appropriate biological problems in terms of differential equations.	c, d
6. Understand and construct a regression analysis for bivariate data.	a, b, c, d
7. Demonstrate an understanding of the concept of a random variable	a, b
8. Understand and apply the binomial, poisson, and normal distributions to appropriate models	a, b, c, d
9. Derive a confidence interval estimate for a population parameter.	a, c

COURSE ASSESSMENT TOOLS

Please describe below all assessment tools that are used in the course. You may also indicate the percentage that each assessment contributes to the final grade.

1. 4 or 5 computer assignments using *Excel* (5% to 10%)
2. 3 or 4 Mid-term exam(s) (50-minute exams) (50% to 45%)
3. Final exam (40%)

DEPARTMENTAL LEARNING OUTCOMES *(to be filled out by departmental mentor)*

The mathematics department, in its varied courses, aims to teach students to

- a. perform numeric and symbolic computations*
- b. construct and apply symbolic and graphical representations of functions*
- c. model real-life problems mathematically*
- d. use technology appropriately to analyze mathematical problems*
- e. state (e1) and apply (e2) mathematical definitions and theorems*
- f. prove fundamental theorems*
- g. construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument.*

Questionnaire

What is your major? _____

Are you sure you need this class? _____

What is the highest level of math you *have yet to complete*? _____

How did you get into this class? (Passed the prerequisite course, placed here upon college entry, placed by an advisor, etc)

Are there any dates during the Spring for which you will not be able to take an exam/quiz due to religious reasons? If so, please state the date(s) and “occasion(s)” below.

How good would you say you are at Algebra? ____ Precalc? ____ Calc 1? ____
(Enter 5 for “I can do it in my sleep!”, 4 for “I’m not the best at it, but pretty awesome.”, 3 for “I’m just OK; I’m good at the basics.”, 2 for “I’m not the worst, but far from the best.”, 1 for “The class was a blur that got more obscure over time!”)

Any general feelings or concerns towards this course? (For example, are you: Scared? Excited? Curious? Indifferent? Based on your perceived ability in math, what grade are you expecting? etc)

Are there any other relevant comments that you wish to add?
