MATH 142 SECTION 1, SEPT-DEC, 2016

INSTRUCTOR:	Michael Lindstrom (Mike)
OFFICE HOURS (MS 5622):	M 17-17:50; W 14-14:50; R 10-10:50 (see door sign if room changed)
CONTACT INFO:	*e*: M I K E L [at] math [dot] ucla [dot] edu, *p*: 310-825-3049
LECTURE TIME/LOCATION:	M/W/F 9:00-9:50 in FRANZ 1260
SECTION WEBSITE:	www.math.ucla.edu/~mikel/teaching/math142
CCLE:	https://ccle.ucla.edu/
	- for course content and class discussion forums
UPDATES:	Check your email! Also see section site and/or Twitter:
	@mikel_ucla_math
OPTIONAL TEXTBOOK:	Mathematical Models by Richard Haberman
PREREQUISITES:	MATH 32B, 33B
TUTORIALS:	R 9:00-9:50 in GEOL 6704
TA:	Will Oakley
CONTACT INFO:	*e*: W G O A K L E Y [at] math [dot] ucla [dot] edu
TA OFFICE HOURS:	T 13-13:50 (MS 2344)

COURSE FORMAT AND BACKGROUND:

You should be proficient with multivariable calculus and differential equations and all related background. In particular, lecture time will not be spent reviewing prerequisite material: solving separable and linear ODEs; solving second order linear ODEs with constant (or non-constant) coefficients with guessing and with variation of parameters; using eigen-analysis to study the stability of critical points in linear ODE systems; the method of Lagrange multipliers; iterated integrals; vector calculus, including vector derivatives and integral theorems such as the divergence theorem; and all basic calculus such as Taylor series, and the chain rule, etc.

Without a solid background, such as a B- or above in the pre-requisite material, this course may not be suitable for you unless you are willing to devote a lot of extra time outside of the course in catching up.

Having some exposure to STEM sciences such as physics/chemistry/biology/engineering would be an asset, but such exposure is not required.

This is an upper division course, which will focus very heavily upon constructing mathematical models of real-world problems and obtaining meaningful and insightful conclusions from the models. This course will survey a wide variety of applied math techniques, the aim being to introduce the techniques, but no particular technique will be studied in-depth; this is to allow for a broader exposure into applied mathematics and modelling.

Exam and homework problems will require careful thought and some creativity: to build proficiency in modelling, deep thought is required. This course will not be easy, and you are expected to devote a lot of time to your homework; consequently, homework is a large portion of your grade.

SUPPORT: You are highly encouraged to form study groups, share notes, collaborate, etc. And don't forget about CCLE discussion forums and office hours!

The purpose of office hours and CCLE discussions are primarily to discuss/clarify course concepts and for homework-related hints on how to approach a problem. Office hours are not designed as a time for the homework to be done for you.

GRADING SCHEME:

Grading is performance based and not based on a curve. In particular, there is no limit to the number of A's that can be assigned! Regardless of your academic background, if you demonstrate mastery of the material, you can get an A!

Your course percentage is computed based on:

– Final Exam – 50%
– Homework* – 20%
– max(Final Exam, Homework*) - 10%
– max(Final Exam, Midterm) – 5%
– max(Final Exam, Class Participation) - 15%
* out of N assigned problems all quarter, the lowest floor(N/3) will be dropped: N will be roughly 10 to 15

Precise cutoffs for letter grades are to be determined; however, the general meaning of an A level grade (A-, A, or A+) is: outstanding work; clear proficiency in all of the course material; solid commitment to the course has been exhibited. Perfection is not required, but students of this category demonstrate determination and strong study skills, even when faced with setbacks or hard exams/assignments. Such students tend to do every assignment, regardless of its apparent difficulty, whether or not they have already earned full homework marks, and fully participate in all aspects of the course. Students at the upper-end of this category have a deep understanding of even the most challenging course topics, appear to have an intrinsic motivation to learn the material, and often think about the material at a deeper level than the course requires. These students are comfortable enough with the course content and have a sufficient enough mastery of topics that they can apply their skills to new problems on exams. Many students here ask a lot of questions and make use of office hours, discussion sections, and other support. All students who earn A-, A, or A+ grades demonstrate proficiency in the material on exams.

In setting the final grades: you will be anonymized (names blocked out) and ranked based on your overall course percentage with various data such as overall course percentage, final exam grade, etc., visible. Grade brackets are chosen to group qualitatively similar groups of students and the divisions are chosen when there is justifiably a difference, based on the data, between two successive students such as a large gap in overall percentages or a noticeable drop in exam performance, etc. Historical grade distributions are also considered in this process, if any grade brackets are otherwise ambiguous. See figure.

It is very likely that an overall percentage below 50% will be an F.

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23|19,17,14,0|12,12,11,11,0,0
33|15,14,9,15|12,11,9,0,11,0
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20|20,12,0,0|12,12,11,6,0,12
46|18,17,0,0|12,11,11,5,6,8
24|23,10,11,0|12,12,9,10,12,0
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Overall course percentages are redacted (greyed regions). Row-by-row, the overall course percentages are arranged in decreasing order.

---'s indicate a grade bracket cutoff: note that any student above a cutoff had a higher overall course percentage (greyed) than the student below. Generally, the letter grade cutoffs are determined by (i) a large percentage gap in overall course percentage or final exam grade (first visible column), or (ii) historical grade data.

Class Participation: Using any internet-enabled device you have, you will submit responses to problems that will be asked during class via a simple web form at
www.math.ucla.edu/~mikel/teaching/math142/php/InputPage.html

If having access to such a device is a problem, consider allowing a neighbour with internet access to submit your answer.

Scoring: you earn 4 points for any response and 1 extra point for correctness. Full marks are earned for earning 72% of all points, i.e., if you respond to every single question given but you are somehow wrong on all of them (unlikely!) then you will still earn 80/72 → 100% here. On the other hand, if you score less than 72% of all points, your mark here will be the fraction of 72% of points you earned so earning 36% of all points (fraction 0.5 of 72) would amount to 50% for a participation mark. This is really about participation and thinking in-class, and not a serious form of assessment!

Midterm: You will be given one 50-minute midterm in class on Friday, October 28.

Homework: You will be given weekly homework assignments each with 1-3 problems. Homeworks must be submitted online on CCLE by the start of class on Fridays as a pdf. No late work will be accepted under any circumstances. You should submit whatever problems you have attempted by the due time because you are scored on individual problems, not individual assignments.

Each homework problem will be scored out of 10 as below:

Formulation and interpretation (3 points): listing assumptions, assessing limitations, drawing insightful conclusions, demonstrating understanding of the model
- 0 ← lacking in detail or unclear
- 1 ← scientific thought is present, but a clear understanding of the model is not conveyed
- 2 ← the model is well understood and presented but some important items may be overlooked
- 3 ← spectacularly clear, nothing left out, highly insightful and accurate

Presentation (3 points): how clearly the logic and work are presented, gaps are not left in the analysis
- 0 ← very hard to follow
- 1 ← some steps are clear
- 2 ← the steps are well-presented except for perhaps one or two areas
- 3 ← spectacularly clear, the reader has no difficulty following the arguments or rationales for various steps

Mathematical Correctness (4 points): correctly using math techniques, proper intermediate results and mathematical justifications, etc.

- If the analysis is complete, 4 points are awarded; if it is at least halfway complete but not all done, 2 points are awarded; otherwise 0 points are awarded.
- Then, for each minor error (minus sign error such that the key results are unaffected, etc.) 1 point is deducted; and for each major error (incorrectly integrating by parts, using an unsuitable technique, etc.), 2 points are deducted.

Final Examination: There will be a final exam covering all the material from the course taking place on December 8, 8:00 – 11:00. The policies are to be determined, but there will be a team component to the exam.

FORMAL POLICIES:

Missing Work: If the final exam is missed for a valid reason, you will be given an oral final exam instead of a deferred standing. University policy states that you cannot pass the course unless you take the final exam.

Valid reasons include one of the following: (a) prior notice of a valid, documented absence (e.g. out-of-town varsity athletic commitment), (b) notification to the instructor within one week due to a medical condition or (c) an emergency. All reasons require written documentation, for example a doctor's or counselor's note stating the student was medically/psychologically unfit to be in school, a copy of a death certificate, or a letter from a coach. A score of zero will otherwise be assigned. Missing the midterm for a valid reason will transfer its weight to the final exam.

Because roughly one-third of homework problems will be dropped and only 72% of participation points are required to earn 100%, no homework grades or participation scores will be excused, no matter what, even for a valid, documented absence.

Collaboration Policy: You must identify all collaborators on your assignments and you must do your own work!

At the top of every assignment, you should declare the following:
I, [YOUR NAME], declare that this work is my own. I did this work honestly and can fully stand behind everything that I have written.

And, if a collaboration took place, also add:

I collaborated with [NAMES OF COLLABORATORS] and I affirm that we all contributed equally in the solution of every problem on which we collaborated.

Under no circumstances does the above declaration entitle you to copy the work of other students! You should also not allow your work to be copied by others as that will only hurt them on exams.

Students with Disabilities: If you have a documented disability, please contact the Office of Student Disabilities and have them consult with your instructor to ensure you are accommodated. It is your responsibility to do this in a timely manner. Special exam accommodations will not be provided by the instructor or TAs.

Regrading: The <u>midterm</u> will be <u>returned at the discussion section</u>. You will then <u>have until the end</u> of that discussion section to <u>request a regrading</u>. To request a regrading:

    (i) you must <u>write</u> a note on a <u>separate piece of paper from your exam</u>, outlining why you are requesting a regrading;

    (ii) you <u>may not write anything extra</u> on your exam;

    (iii) and you must <u>submit</u> your regrading <u>request to your TA by the end of the discussion</u> section in which the test is returned. <u>Once</u> you <u>leave the discussion room with your exam</u>, the <u>grade is final</u>.

Work will <u>not</u> be <u>regraded</u> if items <u>(i)-(iii) are not all satisfied</u>. If you <u>miss</u> the <u>discussion</u> section, you must <u>collect your test from the instructor's office hours within 5 business days of the original return date</u> and then the <u>same policies apply</u>: once you <u>leave the office with your test</u>, the <u>grade is final</u>.

With a regrading, <u>your work in its entirety will be regraded</u> by the instructor, not just the single question(s) you are asking about: your mark could stay the same, go up, or (in some cases) go down.

If you catch an <u>addition error</u>, you still must <u>return your work according to the policies listed above</u>, but <u>none of your test will be regraded</u> – the total will simply be checked and corrected if necessary.

To request a <u>homework regrading</u>, you must submit a <u>handwritten request</u> to your TA <u>in person</u> within 5 business days of the homework grade release date. Your TA will be in-charge of the homework regrades and your mark could stay the same, go up, or (in some cases) go down.

<u>All marks are final after a regrade</u>.

Cheating: If a student is <u>suspected of cheating</u> (on a test, assignment, etc.), the department will be notified immediately and <u>severe academic disciplinary action may follow</u>. This could include expulsion from the university!

Examples of cheating include: starting a test before the designated time, continuing to write when time is up, intentionally looking at another student's exam and copying, intentionally exposing your own exam to a student, copying another student's homework verbatim (even if you just change the variable names, etc., that's plagiaising!), taking work from websites and presenting it as your own, adjusting your answers to an exam after it has been graded and requesting a regrade, or not attending class and getting a classmate to respond to the participation problems on your behalf.

Emails and Course Forums: <u>Homework-specific</u> or <u>conceptual questions</u> should be posted on the <u>online discussions</u> at CCLE instead of an individual email to the instructor or TA. Generally emails will not receive a response.

It is <u>best to speak in person about personal course concerns</u> and to <u>post on CCLE for other questions</u>.

<u>Emails</u> about <u>anything</u> that is <u>answered in the syllabus, in class, or in course announcements will not receive a reply</u>. Also note that some email clients seem to block email replies given from math.ucla.edu: yahoo is particularly bad for this.

Instructor Discretion: The final course marks <u>may</u> be <u>shifted and scaled,</u> and the instructor reserves the right to revise <u>any mark</u>. This syllabus is also subject to change.

GENERAL:

Discussion sections: The <u>discussions</u> are <u>extremely important</u>! The lectures serve to introduce topics, ideas, and build motivation; in the discussions, you will get vital practice and review.

Lateness and Talking: <u>If</u> you do arrive <u>late</u>, please <u>enter with your notebook/laptop, pen, etc. ready</u> and be as quiet as possible to avoid interrupting others.

Unless there is an <u>in-class problem</u> you have been assigned to work on (in which case you are encouraged to talk!), you should not be talking during the lecture. It is disruptive and rude to both your instructor and your fellow classmates; talking will not be tolerated.

Electronic Devices and Distractions: Please <u>turn off</u> the <u>noise</u> on any cell phones, etc. If you may be tempted to use your laptop for non-class activities, be considerate of your classmates and sit towards the back to <u>avoid distracting others</u>.

Participation: You are encouraged to <u>get involved</u> in the material, to <u>answer questions</u> in class and on the forums, and to <u>ask questions</u> when you're unclear of what's going on. Don't be afraid to ask questions! To better engage with classroom discussion, <u>please try to sit next to at least one classmate</u> to discuss in-class problems.

Review: There will be at least one review session prior to the final exam, possibly more.

Succeeding: There is no rule that anyone has to fail! <u>There is absolutely no reason you cannot excel in this course if you work for it!</u>

SUCCESS TIPS:

– <u>Attend class</u>. Hearing information live, doing problems, and being able to ask your own questions is important and correlates strongly with exam performance.
– <u>Attend your discussion sections</u>. Lecture time is very limited: there is reason why 1 hour per week is scheduled for this course outside of lectures.
– <u>Do not get behind</u>: once there is a topic you are weak with, it could very well prevent your understanding subsequent topics. The material does build.
– <u>Beware the "familiarity fallacy"</u>: just because you've seen a topic before, doesn't mean that you have mastered it.
– Make use of <u>office hours and discussion forums</u>.
– Don't be afraid to speak with your instructor: <u>you are not just a number</u>!