Math 427K: Advanced Calculus for Applications I

Unique Number 57085

Fall Semester 2013

Where am I?

You are in Associate Professor Dan Knopf's Math 427K class. Your TA is Sona Akopian.
Lectures meet 9:30–10:45 Tuesdays and Thursdays in CLA 0.130.
Discussion sessions meet 4:00–4:50 Mondays and Wednesdays in PHR 2.108.

Why am I here?

Ordinary and partial differential equations are fundamental tools used by modern science and engineering. In these disciplines, differential equations are applied to produce mathematical models of complex physical phenomena. Consequently, it is seldom enough merely to know that a differential equation has solutions. It is more important to know when these solutions are unique and how to understand and approximate their behaviors, so that one can gain insight into the physical processes the differential equation is supposed to model. This course will introduce you to a variety of important techniques used to find and qualitatively analyze solutions of differential equations, with emphasis on those that arise in applications.

What are the prerequisites for this course?

The prerequisite is Math 408D or 408L (or equivalent) with a grade of at least C.

What materials should I have?

Elementary Differential Equations and Boundary Value Problems, Ninth Edition, by William E. Boyce and Richard C. DiPrima. John Wiley & Sons, Inc.

How can I get extra help?

- The contact information for your professor and TA is below. We encourage you to come to us for individualized help if needed!

Name	E-mail	Office	Phone	Office hours
Dan Knopf	danknopf@math.utexas.edu	RLM 9.152	512.471.8131	1:30–3:30 Tuesdays
Sona Akopian	sakopian@math.utexas.edu			

- This course will use BLACKBOARD. The syllabus, class announcements, assignments, answer guides, and supplementary learning materials will be posted there.

- This course is supported by PLUS (Peer-Led Undergraduate Studying). PLUS study groups provide opportunities to collaboratively practice skills and knowledge useful for success in this course. You are free to attend any PLUS study group at any point in the semester. Information on meeting times and locations will be available through Blackboard and class announcements. To learn more about PLUS, visit wikis.utexas.edu/display/PLUS or find PLUS on Facebook.

- The syllabus will be updated during the semester for pedagogical reasons and as exam room scheduling becomes known. A current version will always be available on BLACKBOARD, as well as through a link from my home page:

  www.ma.utexas.edu/users/danknopf

- Contact information for the Mathematics Advising Center may be found at:

  www.ma.utexas.edu/academics/undergraduate/advising/

How will the course be graded?

This course carries the *Quantitative Reasoning* flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

There will be quizzes on homework, two midterm exams, and a cumulative final.

- **Homework/Quizzes:** There will be eleven homework assignments. Each assignment will be posted on BLACKBOARD approximately one week before it is due. Assignments will be due on most Wednesdays; see the schedule below. The main purpose of homework is learning, not assessment. So the homework itself will not be graded. But to track how well you learn its contents, there will be a short quiz during discussion session each Wednesday that homework is due. *Each quiz will consist of one or two homework problems from that week — verbatim.* So if you have worked diligently on the homework, you will be well prepared to get good quiz grades.

  - **The lowest two quiz scores will be dropped**, to allow for illness, emergencies, and other valid excuses.
  - **The remaining nine scores will be averaged to determine 15% of your overall grade.**
  - **There will be no make-up quizzes.** A missed quiz counts as a zero, hence qualifies as one of your two dropped scores. (The sole exception is a conflict with a religious holiday, in which case you must notify me in advance; see below.)

- **In-class exams:** There will be two in-class midterm exams. (See the schedule below.) Each midterm will count for **25%** of your overall grade.

  - **No exam scores are dropped.**
  - If you miss an exam, you must contact me *before* the exam and provide a valid written **serious** excuse in order to be allowed to take a make-up.

- **Final exam:** The final will determine **35%** of your overall grade.

  - The final exam time and location are set by the Registrar. (See schedule below.) You may request an alternate time for your final exam only for a **very serious** reason, such as hospitalization.

Your overall grade will be computed according to a scale at least as generous as this:

F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A
0–50	51–55	56–63	64–65	66–67	68–75	76–77	78–79	80–87	88–89	90–91	92–100

Can you give me some tips for the course?

- **Attend lectures.** I will post my lecture notes on BLACKBOARD. They are a resource to help you study, but they are not a substitute for attending lectures. If you skip class, you rob yourself of opportunities to hear explanations of difficult material, to ask questions, and to get valuable experience working on selected examples.

- **Attend problem sessions.** Because I must introduce new concepts during lectures, there simply isn't time to work as many examples as would be pedagogically ideal. Problem sessions offer many more opportunities to learn from examples, clarify ideas, and practice using new concepts. Problem sessions are valuable resources for learning and review. Note in particular that the problem session immediately before an exam reviews the exam topics, while the problem session immediately after an exam reveals the correct exam answers.

- **Come to office hours.** Office hours offer valuable opportunities to reinforce concepts, clarify confusing issues, work more examples, and get individualized feedback. Both your TA and I are happy to see students in our office hours.

- **Ask questions** — in lecture, during problem sections, and in office hours. Your questions help your TA and I to provide the explanations you need.

- **Do the homework.** No students, no matter how talented, can learn mathematics without working examples themselves. The most important component of success in virtually every math course is diligence in doing practice exercises.

- **Read the text.** To get the most benefit from the lectures and problem sessions, you should read relevant sections of the text as they are covered in class.

- **Study together.** You are encouraged to study together with your peers enrolled in the class. PLUS provides an excellent structure to facilitate group learning. Take opportunities to get to know your classmates, and make arrangements to share notes in case you miss class due to illness.

- **Learn to work problems either with or without a electronic aids.** You may use a calculator or mathematical software on homework problems — but not during quizzes or exams.

- **Be honest.** Any academic dishonesty will be severely penalized. In this regard, please note that **no books, notes, calculators, computers, or mobile phones are allowed in quizzes or exams**.

What is the lecture schedule?

The following lecture schedule may be altered for pedagogical reasons. **It is your responsibility to be aware of any changes announced in class.** You should attend problem sessions each Monday and Wednesday, even though Mondays are generally not listed on the schedule below.

Wednesday, August 28 *First problem session — calculus review*

Thursday, August 29 Introduction, Sections 1.1, 1.2

Monday, September 2 *Labor Day holiday — no classes*

Tuesday, September 3 Sections 1.3, 2.1

Wednesday, September 4 *Quiz 1*

Thursday, September 5 Sections 2.2, 2.3

Tuesday, September 10 Section 2.5

Wednesday, September 11 *Quiz 2*

Thursday, September 12 Sections 2.6, 3.1

Friday, September 13 *(Twelfth class day: last day to drop with a possible refund)*

Tuesday, September 17 Section 3.2

Wednesday, September 18 *Quiz 3*

Thursday, September 19 Section 3.3

Tuesday, September 24 Sections 3.4, 3.6

Wednesday, September 25 *Quiz 4*

Thursday, September 26 Section 3.7

Tuesday, October 1 Sections 3.8, 4.1

Wednesday, October 2 *Quiz 5*

Thursday, October 3 Section 4.2, Review

Tuesday, October 8 Exam I — in class, at regular class time

Wednesday, October 9 *No quiz — exam solutions revealed*

Thursday, October 10 Sections 7.1, 7.2

Tuesday, October 15 Sections 7.3, 7.5

Wednesday, October 16 *Quiz 6*

Thursday, October 17 Sections 7.6, 7.8

Tuesday, October 22 Sections 9.1, 9.2

Wednesday, October 23 *Quiz 7*

Thursday, October 24 Sections 9.3, 9.4

Tuesday, October 29 Sections 5.1, 5.2

Wednesday, October 30 *Quiz 8*

Thursday, October 31 Sections 5.3, 5.4

Tuesday, November 5 Section 10.1   *(Last day to drop or change to/from pass/fail)*

Wednesday, November 6 *Quiz 9*

Thursday, November 7 Section 10.2, Review

Tuesday, November 12 Exam II — in class, at regular class time

Wednesday, November 13 *No quiz — exam solutions revealed*

Thursday, November 14 Section 10.5 (Appendix A)

Tuesday, November 19 Section 10.7 (Appendix B)

Wednesday, November 20 *Quiz 10*

Thursday, November 21 Section 10.8

Tuesday, November 26 Sections 6.1, 6.2

Wednesday, November 27 *No quiz*

Thursday, November 28 *Thanksgiving holiday — no class*

Tuesday, December 3 Sections 6.3, 6.4

Wednesday, December 4 *Quiz 11*

Thursday, December 5 Section 6.5, Review

Saturday, December 14 Final Exam, 7:00–10:00 PM; UTC 2.102A

Policies

Academic integrity Any academic dishonesty will be severely penalized. Your assignments, quizzes, and exams must be your own work.

Accommodations The University of Texas at Austin provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities (phone 512.471.6259, video phone 866.329.3986). Their website is:

www.utexas.edu/diversity/ddce/ssd/

If you fall under the University's Learning Disability Policy, it is your responsibility to deliver the SSD certification of that fact to me as early in the semester as possible, and no later than one week prior to the first exam.

Religious holidays By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holiday. If you must miss a class, an assignment, a quiz, or an examination in order to observe a religious holiday, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Safety recommendations Please note the following guidelines:

- Occupants of buildings on the University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and reassembling outside.
- If you require assistance in evacuation, please inform me of this fact in writing during the first week of class.
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- In the event of an evacuation, follow the instruction of faculty or instructors.
- Do not re-enter a building unless given instructions by one the following: Austin Fire Department, the University of Texas at Austin Police Department, or a Fire Prevention Services officer.
- If you have concerns about your stress levels or those of a classmate, you may contact the university's *Behavior Concerns Advice Line* at 512.232.5050.
- For further information, see `www.utexas.edu/emergency` or contact the Office of Campus Safety and Security, `www.utexas.edu/safety/` at 512.471.5767.