

# Math 427K: Advanced Calculus for Applications I

**Unique Number 55160**

Fall Semester 2011

## Where am I?

You are in Associate Professor Dan Knopf's Math 427K class. Your TA is Chris White. Lectures meet 9:30–10:45 Tuesdays and Thursdays in JGB 2.216. Problem sessions meet 5:00–5:50 Mondays and Wednesdays in WRW 102.

## 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!

<i>Name</i>	<i>E-mail</i>	<i>Office</i>	<i>Phone</i>	<i>Office hours</i>
Dan Knopf	danknopf@math.utexas.edu	RLM 9.152	471.8131	3:00–5:00 Tuesdays
Chris White	cwhite@math.utexas.edu	RLM 11.130	475.9598	3:00–5:00 Thursdays & 12:00–2:00 Fridays

- This course will use BLACKBOARD. Class announcements will be posted there, and we will maintain a discussion board, called *MathChat*, where you may submit questions and share answers. Your TA and I will check these frequently, answering your questions as promptly as possible.
- The syllabus will be updated during the semester 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:

[http : //www.ma.utexas.edu/users/danknopf](http://www.ma.utexas.edu/users/danknopf)

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

[http : //www.ma.utexas.edu/academics/undergraduate/advising/](http://www.ma.utexas.edu/academics/undergraduate/advising/)

- 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 471.6259, video phone 866.329.3986). Their website is:

[http : //www.utexas.edu/diversity/ddce/ssd/](http://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 at least one week prior to the first exam.**

## How will the course be graded?

There will be quizzes on homework, two midterm exams, and a cumulative final. There will also be one (and only one!) opportunity for extra credit.

*By UT Austin policy, if you must miss an assignment or exam in order to observe a religious holy day, you must notify me at least two weeks prior to that day. You will be given an opportunity to complete the missed work within a reasonable time after your absence.*

- **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 schedule below. The main purpose of the homework is learning, not assessment. So the homework itself will not be graded. But to assess how well you learned 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 prepared to get good quiz grades.
  - **The lowest two quiz scores will be dropped**, to allow for illness, emergencies, and other valid nonacademic 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 holy day, in which case you must contact me at least two weeks in advance; see above.)
- **In-class exams:** There will be two in-class exams. (See schedule below.) Each 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 is 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.
- **Extra credit:** You will each receive an email asking you to participate in a pilot online assessment project using QUEST, a computerized Learning and Assessment system maintained by the College of Natural Sciences. The assessment is an hour-long online quiz to be taken between 12:00 noon on Friday, August 26 and 10:00 AM on Monday, August 29. Your score in this pilot assessment will count towards **1%** extra credit in the course (i.e. up to 1 point added to the 100-point scale below).

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 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.
- **Ask questions** — in lecture, during problem sections, and on BLACKBOARD.
- **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.
- **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.
- **Study together.** You are encouraged to study together with your peers enrolled in the class. 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 calculator.** You may use a calculator 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, or mobile phones are allowed during 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.**

**Wednesday, August 24** *First problem session — calculus review*

**Thursday, August 25** Introduction, Sections 1.1, 1.2

**Tuesday, August 30** Sections 1.3, 2.1

**Wednesday, August 31** *Quiz 1*

**Thursday, September 1** Sections 2.2, 2.3

**Monday, September 5** *Labor Day holiday — no classes*

**Tuesday, September 6** Section 2.5

**Wednesday, September 7** *Quiz 2*

**Thursday, September 8** Sections 2.6, 3.1

**Friday, September 9** *(Twelfth class day: last day to drop with a possible refund)*

**Tuesday, September 13** Section 3.2

**Wednesday, September 14** *Quiz 3*

Thursday, September 15 Section 3.3  
Tuesday, September 20 Sections 3.4, 3.7  
Wednesday, September 21 *Quiz 4*  
Thursday, September 22 Section 3.6  
Tuesday, September 27 Sections 3.8, 4.1  
Wednesday, September 28 *Quiz 5*  
Thursday, September 29 Section 4.2, Review  
Tuesday, October 4 **Exam I — during regular class time in UTC 2.112A**  
Wednesday, October 5 *No quiz — exam solutions revealed*  
Thursday, October 6 Sections 7.1, 7.2  
Tuesday, October 11 Sections 7.3, 7.5  
Wednesday, October 12 *Quiz 6*  
Thursday, October 13 Sections 7.6, 7.8  
Tuesday, October 18 Sections 9.1, 9.2  
Wednesday, October 19 *Quiz 7*  
Thursday, October 20 Sections 9.3, 9.4  
Tuesday, October 25 Sections 5.1, 5.2  
Wednesday, October 26 *Quiz 8*  
Thursday, October 27 Sections 5.3, 5.4  
Tuesday, November 1 Section 10.1 (*Last day to drop*)  
Wednesday, November 2 *Quiz 9*  
Thursday, November 3 Section 10.2, Review  
Tuesday, November 8 **Exam II — during regular class time in UTC 2.112A**  
Wednesday, November 9 *No quiz — exam solutions revealed*  
Thursday, November 10 Section 10.5 (Appendix A)  
Tuesday, November 15 Section 10.7 (Appendix B)  
Wednesday, November 16 *Quiz 10*  
Thursday, November 17 Section 10.8  
Tuesday, November 22 Sections 6.1, 6.2  
Wednesday, November 23 *No quiz*  
Thursday, November 24 *Thanksgiving holiday — no class*  
Tuesday, November 29 Sections 6.3, 6.4  
Wednesday, November 30 *Quiz 11*  
Thursday, December 1 Section 6.5, Review  
Friday, December 9 **Final Exam, 2:00–5:00, FAC 21 (Peter T. Flawn Academic Center)**