

Survey of Calculus (MAT 134), Fall 2013

Dr. Karl-Dieter Crisman

- Section A MWF 9:10-10:10 Jenks 209
- Section B MWF 2:10-3:10 Jenks 209

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Office Info: I'm in KOSC 245 by the other math faculty. Scheduled office hours are MWF 11:25-12:25 and Th 9:00-12:00. You do not have to schedule for those times, and usually can even swing by a few minutes early or stay a few minutes late.

If those times do **not** work for you, *please* don't hesitate to schedule an alternate time which does, or to drop by. Email is usually the best way of reaching me, except Sundays.

Math Help: ASC has tutoring available. In the past it has been in Chase 34 on Su, M, Tu, Th from 6-8 PM; check with Academic Support for this semester's details. Feel free to take advantage of this! In fact, I encourage it.

Texts: Hughes-Hallett et al., *Applied Calculus*, fourth edition
Maor, *e: the Story of a Number*

Dates:	Written Homework Due	(typically)	Daily
	WeBWorK Due	(typically)	Daily
	Online Responses	(typically)	Daily
	Exams	(tentative)	Oct. 2 nd , Oct. 21 st , and Nov. 22 nd
	Essay	(Drafts and Final)	Sep. 16 th , Oct. 28 th , and Nov. 18 th
	Final Exam	(Section A)	Wednesday, December 18 th , 9:00-11:00
Final Exam	(Section B)	Thursday, December 19 th , 9:00-11:00	

All items above are subject to change, except the final exam. Do **not** schedule any travel plans home before your exam!

Schedule of Topics:

- Functions and Change (Chapter 1)
- Rate of Change: The Derivative (Chapter 2)
- Accumulated Change: The Definite Integral (Chapter 5)
- Shortcuts to Differentiation and Antiderivatives (Selections from Chapters 3 and 7)
- Using the Derivative and Definite Integral (Selections from Chapter 4 and 6)

Each topic will be covered for 2-3 weeks; we will follow the book, but not slavishly.

Assessment and Grading: Homework is the most important individual component to assessment; it will be daily, and help you both learn and review. Do *not* wait until the next day to begin the homework! Start the same day, try a few of them, review, try a few more, email me for questions, and so on. Also, please be kind to the grader, who is a fellow student, and **write your solutions neatly and in order on stapled sheets with your name on them!**

In each assignment, several problems will be graded (a representative sample). Each graded problem will receive 3 points for a complete, correct solution with all work shown; 2 points for a correct solution missing some explanation or correct method with a minor error (such as forgetting a minus sign); 1 point for major errors but an honest attempt, or a correct answer to a more in-depth problem with no explanation; and 0 points for no attempt, or for only rewriting the statement of the question. You may submit late homework for 3/4 credit; after a week late, I reserve the right to reject late homework or to simply give partial credit based on completeness. Overall completeness may also count.

WeBWorK is a supplement to the written problems, and provides immediate feedback on your understanding, usually of more routine problems (just 2 or 3 per set). You may try as often as you like on WW problems, but there are no late submissions, and they are due by the midnight *before* class. WW sets are graded on a straight percentage basis.

There will be several in-class chapter/topic exams on the material. The final exam will be a little longer than the in-class exams; it will be cumulative.

The functions/calculus point of view is mainly relevant because modern life, especially many of your majors' disciplines, are full of all kinds of functions. In order to help you find a good personal viewpoint on this, there will be a short essay as a component to your grade. It will just be a survey of what you find in investigations – where they show up, what kind of representations to expect, what kinds they are, and so on. This can be from your discipline, or from contemporary events/news.

Finally, to encourage you to read the text ahead of time and participate productively during class, some of the grade will be based on 'participation points' from doing things like daily online responses or presenting attempts at homework solutions in class. You will be graded on a straight percentage basis out of 40 points. Presentations will count for 2 points, online responses for 1, and other things will be variable; the first couple times visiting office hours or Math Help will also get credit. Naturally, I reserve the right to modify any student's score for exceptional classroom participation or dismal attendance, etc. Texting, tardiness, random exits or other distracting behavior definitely counts against this.

Written homework performance will be counted for 24%, and WW for 8%. The three in-class exams, averaged, count 35% of your grade, and the final exam will count for another 15% of the grade. The essay will count for 10%, and the final 8% of the grade will come from the the participation items, as outlined above (so that five participation points is one final grade point).

Why Are We Here?

Course Objective: The Calculus is a fantastic human achievement. How do we state and solve problems dealing with change and time? Newton and Leibniz discovered remarkable links between the concepts of rate of change and total change, and then provided the world with the algebraic tools to do everything from voice recognition on your computer to predicting spread of disease.

Our objective is to understand those big concepts in terms of both math and everyday language, and to develop enough technical tools for further study in fields such as biology or finance. We also hope to briefly touch on connections to philosophy and more general issues of a Christian response to mathematization in our culture.

Course Description: “Introduces differentiation and integration of algebraic and transcendental functions in unified manner. Emphasizes conceptual understanding and problem solving rather than theory. For students with high school algebra and working knowledge of functions. Core nonlab option for students entering before fall 2009. Fulfills core Natural World theme.”

Goals for Learners: Gordon’s “Goals for Learners” include:

- Grow in intellectual curiosity through foundational studies in the liberal arts. . .
- Cultivate . . .critical thinking, discernment, and perseverance
- Pursue truth as revealed by God in . . .creation

Some specific objectives we have which connect to these are:

- Be able to demonstrate understanding of the basic calculus ideas of derivative and integral.
- Be able to analyze, set up, and solve a typical multi-step differential calculus problem, such as optimization.
- Be able to interpret and compute with a calculus-based model of a real-world situation.

Technology: I will check email daily and post assignments on Blackboard. You will check email and Blackboard daily as well, because **that is where assignments and responses live**, as well as other important information like changes. If you have any questions on how to use the site (blackboard.gordon.edu), contact the CET at x4500 to set up some training.

Naturally, please turn off your cell phone before class begins. No texting, either! ☺

You should also bring your textbook to *every* class, as well as a calculator which can do simple arithmetic, powers, logs, and trig. For more advanced computation and graphing, you may use any technology you like (calculator, computer, Google...). The Mac computers in KOSC 118 should all have the program *Grapher* available, which does these things easily. For online homework problems, we will use the online homework system WeBWoRK (<http://webwork.math.gordon.edu>).

Academic Dishonesty: See page 8 of your Student Handbook. In this class, this will particularly apply to writing up homework. Please do work together! But do not also write down the answers together; they may end up too similar. That is a good incentive to rewrite solutions neatly!

The essay should also be your own work, citing all sources.

Attendance Issues: In general, you should be at every class session. Since we will often emphasize aspects of the calculus which are not strictly plug-and-chug, your attendance will help you over the conceptual humps. We will also have some group work, and missing this will affect your course grade as outlined above.

You may miss up to four classes without this (potentially) impacting your grade, and ordinarily this would include field trips or illness. Under exceptional circumstances involving Gordon-related activities or illness, this may be waived with proper documentation.

Please also be on time! This is a courtesy to me *and* to your fellow students, because many of us have trouble getting new concepts with constant interruptions. So, **use the restroom before class**, and avoid arriving late.

Students with Disabilities: Gordon College is committed to assisting students with documented disabilities (see Academic Catalog Appendix C, for documentation guidelines). A student with a disability who may need academic accommodations should follow this procedure:

1. Meet with a staff person from the Academic Support Center (Jenks 412, x4746) to:
 - (a) make sure documentation of your disability is on file in the ASC,
 - (b) discuss the accommodations for which you are eligible,
 - (c) discuss the procedures for obtaining the accommodations, and
 - (d) obtain a **Faculty Notification Form**.
2. Deliver a Faculty Notification Form to each course professor *within the first full week of the semester*; at that time make an appointment to discuss your needs with each professor.

Failure to register in time with your professor and the ASC may compromise our ability to provide the accommodations. Questions or disputes about accommodations should be immediately referred to the Academic Support Center. See Grievance Procedures in Student Handbook.

Welcome to Class: Please contact me with questions – I look forward to the experience!

Tentative schedule of Readings and Assignments

This schedule **may change at any time** via in-class announcements or Blackboard, and is **not** final! You are responsible for these.

Readings etc. are for *the day listed*. **Online Responses** will be posted on Blackboard only, and WeBWorK will be on that server, so **check BB and WW daily**. Numbers in the style 1.2 refer to our main text by Hughes-Hallett et al.; numbers in the style M3 refer to Chapters in the Eli Maor text, and those in the style MPA 200 refer to pages in “Mathematics in a Postmodern Age”, which is on reserve in the library.

Date	Topic	Reading Due	Homework Due
Aug. 28	Intro		
Aug. 30	Functions	1.1	Intro Survey
Sep. 2	(Labor Day)		
Sep. 4	Linear Functions	1.2	1.1 # 3, 4, 5, 8-12, 14, 15, 17, 22, and 25
Sept. 6	Change	1.3	1.2 # 9, 11, 12, 17, 18, 21, 23 and 24
Sep. 9	Exponential	1.5	1.3 # 1-4 , 9, 10, 13, 14, 19, 21, 25, 26, and 38
Sep. 11	Logarithms	1.6	1.5 # 2, 3, 8, 9, 15, 16, 25, and 26 (in 8 also check actual 2010 pop.)
Sep. 13	Infinity	M5	1.6 # 1, 7, 10, 15, 21, 23, 24, 27, 32, and 35
Sep. 16	Rate of Change	2.1	Prelim. Essay Draft
Sep. 18	Derivatives	2.2	2.1 # 2, 4-7, 10, 11, 16, and 19
Sep. 20	Interps. of Derivs.	2.3	2.2 # 2-4, 7, 8, 10, 21-25, and 29
Sep. 23	Second Derivs.	2.4	2.2 # 15, 16, 26, 30, and 31 2.3 # 6, 8, 9, 13, 17, 21-25, and 42
Sep. 25	Deriv. Wrapup		2.3 # 3, 18, 34, and 43 2.4 # 5-8, 10, 11, 15a, 17, 20, and 21
Sep. 27	Accumulated Change	5.1	2.4 # 2, 12, 14, 23, 24, 2.5 # 2, 3, 7, 8, and 10 Ch. 2 Review # 4, 5, 12, 23, 36, and 39
Sep. 30	Definite Integral	5.2	5.1 # 4, 6, 9, 10, and 19 Ch. 2 Review T/F # 1-3, 13-16, 22, 27, 28, 34
Oct. 2	Exam	2.1-2.4	
Oct. 4	Area	5.3, M6-7	5.1 # 2, 7, 13, 16, and 17 5.2 # 1, 3, 4, 5, and 10
Oct. 7	Interps. of Integrals	5.4	5.3 # 2, 10, 5.2 # 9, 13, 16, 18, 24, and 27 (Extra inst. for # 13, 22, 24, and 27)
Oct. 9	Fund. Thm.	5.5	5.3 # 3, 5, 12, 14-17, 19, 21, and 22 5.4 # 14, 15, and 21
Oct. 11	Deeper Ints.		5.4 # 4, 5, 9, 19, 23, and 33 5.5 # 5, 10, 11, and 13

Date	Topic	Reading Due	Homework Due
Oct. 14	Growth and Decay	1.7 (10.4?) M3-4	5.5 # 6, 7, 5.5 # 12, 7.5 # 1, 18, and 22 7.3 # 2 and # 7 (with in-class inst.) Ch. 5 Review # 8, 21, 25, 28, 29, and 42
Oct. 16	Power Functions	1.9	1.7 # 3, 4, 6, 11, 15, 18, 33, 34, 36, and 37
Oct. 18	(Quad Break)		
Oct. 21	Exam	5.1-5.5	
Oct. 23	Messing with Functions	1.8	1.8 # 7 and 12ab 1.9 # 6, 9, 13, 15, 17, 20, and 28
Oct. 25	Periodic functions	1.10	1.8 # 9c, 10c, 35, 36, 39ab, 42 1.9 # 19, 1.10 # 2, 3, 11, and 12
Oct. 28	Basic Formulas	3.1	Second Essay Draft
Oct. 30	Exp. Formulas	3.2	3.1 # 6, 9, 15, 18, 21, 30, and 33 3.1 # 39, 42, and 46, 1.10 # 5, 8, and 13
Nov. 1	Chain Rule	3.3	3.1 # 22, 44, 55, and 60, 7.1 # 1, 4, and 9 3.2 # 5, 6, 17 and 20
Nov. 4	Antiderivatives	7.1	3.2 # 12, 15, 16, 25, 27, 33, 43, and 45 3.3 # 3, 6, 7, 8, 11, 15, 27, 7.3 # 2-4
Nov. 6	Product Rule	3.4	3.3 # 10, 13, 19, 22, and 49 7.1 # 38, 41, 46, 49, 51, 7.3 # 7, 15, 16
Nov. 8	Periodic Derivs.	3.5, M1-2	3.4 # 2, 3, 8, 11, 15, 17, 25, and 37 3.5 # 2, 3, 7, 9, and 15
Nov. 11	Using the FTC	7.3, M8-9	3.4 # 16, 28, 3.5 # 16, 22 and 25 7.1 # 24-26, 56, 57, 7.3 # 17 and 18
Nov. 13	Local Extrema	4.1	3 Rev. # 49, 56, 67, 68, and 79 7 Rev. # 6, 8, 14, 20, 23, 27, and 46 Pick 10 from 3 Rev. # 1-40
Nov. 15	Concavity	4.2	Essay Due (or next time, your choice)
Nov. 18	Global Extrema	4.3	4.1 # 9, 11, 12, 16, 21, 28, 29, and 36ac 4.2 # 2, 10, 12, and 15
Nov. 20	More on Extrema	4.5	4.2 # 16, 17, 25, and 31 4.3 # 3, 6, 10, and 19
Nov. 22	Exam	3.1-3.5, 7.1, 7.3	
Nov. 25	More Deriv. Apps.	4.6, MPA189-192 MPA202-205	4.3 # 21, 31, and 37 4.5 # 4b, 7, and 9ac
Nov. 27	(Thanksgiving Break)		
Nov. 29	(Thanksgiving Break)		
Dec. 2	More Deriv. Apps.	4.7	4.6 # 1, 5, 6, 10, 11, 13, and 15
Dec. 4	Average Value	6.1	4.7 # 1, 2, 3, 4, and 16 Rev. 4 # 43 and 44
Dec. 6	More Int. Apps.	6.3	6.1 # 1-5, 9, 11, 13, 16, and 21
Dec. 9	More Int. Apps.	7.5, MPA 208-219	5.5 # 3, 4, 7, 6.3 # 1, 2, 6, 11
Dec. 11	Wrap-Up		7.5 # 3, 9, 10, 15, 17, Rev. TBA
Dec. 13	(Reading Day)		
Dec. 18/19	Final Exam	Everything!	