

Ma 471 Advanced Calculus Fall 2014

MA 471G 002
Advanced Calculus I
Fall 2014

Instructor: Prof. Richard Carey

MWF 1000-1050 CB 341

Office POT 965

Office Hours: MW 0300-0500 & by appt.

Phone 257-3745

richard.carey@ms.uky.edu

Text: *Advanced Calculus* 3^h ed., 1978 by R. Creighton Buck & Ellen F. Buck

References: *Principles of Mathematical Analysis* 3^h ed., 1976 by Walter Rudin
Real Functions, 1953 by Casper Goffman

Prerequisite: MA 214 and MA 322.

Background: It is assumed that the students have learned to use elementary calculus, but are not experienced in the techniques of proof and rigorous reasoning. After the elementary calculus sequence advanced calculus usually provides the student's first experience with an abstract analysis mathematical course.

This course, the first of a two course sequence, provides a rigorous foundational introduction to the analysis of real-valued functions. Guiding principles of imagination and intuition remain basic but are translated into more precise abstract language. Course content includes theorems and proofs given in more or less complete form. In particular, the student becomes acquainted with the principles of mathematical reasoning using patterns of number sets and number valued functions. Aspects of set theory relevant to the study of real-valued functions are considered while basic properties of the set \mathbb{R} of real numbers, such as ordering (not available with complex numbers), field (an algebraic property) and completeness (a notion from mathematical logic) axioms are used. Concepts of continuity are introduced via a topology on the real numbers. We reprise concepts of monotone and inverse functions, define the derivative of a function and prove some mean value theorems. The course also deals with Riemann integration theory both in one and two variables. However, the fundamental theorem of calculus in several variables awaits the second course in the sequence. The following topics from the text are expected to be covered:

Appendix 1 Logic and Set theory

Appendix 2 Foundations of the Real Number System

Chapter 1 Sets and Functions

Chapter 2 Continuity

Chapter 3 Differentiation

Chapter 4 Integration

Chapter 5 Series

Chapter 6 Uniform Convergence (of functions)

Grading: Your grade will be calculated from the following distribution of points:

Oral Presentations: (100 points) Everyone will be expected to present some number of problems in class. These presentations need to be both clear and concise. Further, the rest of the class is responsible for monitoring the presentation for accuracy. Details regarding the oral presentations will be provided on a separate handout later on

Homework problems: (50 points) From time to time I will ask for a complete solution to a particular homework problem to be submitted. Your solution will be graded on the basis of accuracy, exposition and neatness. Preparation of problems for presentation must be your own, and submission of written homework problems must also be done on an individual basis.

Exams: Exams will be take-home and there will be three of them. The grading scale for the first two will be

	90-100	A
80-89	B	
70-79	C	
60-69	D	
Below 60	E	

The grading scale for the final exam will be as follows:

117-130	A
104-136	B
91-103	C
78-90	D
below 78	E

Your course score will be the sum of your test scores and the instructor score.

The grading scale for the course will be as follows:

Cumulative score	Grade
432-480	A
384-431	B
336-383	C
288-335	D
below 288	E

The exams will be curved in the following way. The mean of all students who earn 40% (55% on the final exam) or more on an exam will be computed. Points will be added to the scores so this mean is adjusted to a score of 75 (97.5 on the final). If the mean is 75 or more, no points are added to the scores. You must bring a photo ID to each exam and you may use a calculator on the exams.

Exam, Quiz and Attendance Policy: It is very important to take each exam on schedule. Missed work may be made up only due to illness with medical documentation or for other unusual (documented) circumstances. (See your Student Rights and Responsibilities <http://www.uky.edu/StudentAffairs/Code/>). Students who have university excused absences or who have university-scheduled class conflicts with uniform examinations may arrange with their instructor to take the exam at an alternate time. Work-related conflicts are neither university excused absences or university-scheduled absences. If you miss an exam, you receive a zero. You will be eligible for a make-up only if you present a valid excuse to me before the exam. If you cannot find a reasonable arrangement for a make-up, contact the department DUS David Royster. If you generate 5 (unexcused) recitation classes your cumulative score drops by 10%, i.e., from A to B. If you miss 6 (unexcused) recitation classes your cumulative score drops 15%; if you miss 7 recitation sections you lose 20%, e.g., A to C. If you miss 7 or more recitation classes you get an E. This policy begins September 10, 2014.

Excused Absences: S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences:

1. serious illness;
2. illness or death of family member;

3. University-related trips;
4. major religious holidays;
5. other circumstances you find to be "reasonable cause for nonattendance."

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day for adding a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (257-2754).

Cheating: Cheating will not be tolerated, and you are responsible for knowing University policy on cheating. The University's minimum policy for cheating is failure in the course. (Yes, the chair of the department does spend time each semester prosecuting students who thought they'd never get caught!) Cheating can lead to expulsion from the university. For a complete description of University policies on excused absences, cheating, and student responsibilities see UK's New Academic Offenses Policy can be found at

<http://www.chem.uky.edu/research/grossman/acadoffenses/index.htm>

For instance, Senate Rule 6.4.11 states:

The minimum penalty for an academic offense is an E in the course in which the offense took place. The repeat option may not be used to remove an E given for an academic offense. If a prior academic offense has been recorded in the Registrar's Office, the minimum penalty shall be suspension for one semester (or a minimum of four months in those colleges in the Medical Center where the semester system is not in use. Penalties more severe than the minimum may be imposed where warranted by the circumstances.

Our class is a cell phone-free zone. Cell phones must be off & out of sight for the entire class period.

Important Dates

August 27 (Wed.)..... First day of classes
 September 1 (Mon.).....No classes – Labor Day

September 3 (Wed.) Last day to add a class
September 17 (Wed.)....Last day to drop a class without a grade
October 3 (Fri.)..... Examination 1
October 20 (Mon.)Midterm
November 7 (Fri.)..... .Last day to withdraw from a class
November 26-29 (Wed.-Sat.)..... No classes-Thanksgiving
November 14 (Fri.)Examination 2
December 12 (Fri.) Last day of classes
December 17 (Wed) 0800 – 1000 am Final Examination

Note: There is an official procedure for dropping a course. You haven't withdrawn if you simply quit attending. A student who drops a class before February 5 will receive no grade. A student who withdraws after February 5 will receive a grade of W. After March 7 no student will be allowed to withdraw unless his/her dean determines that unusual circumstances merit the withdrawal.

POSTED BY [R.CAREY](#) AT [1:06 PM](#) [NO COMMENTS:](#)

TUESDAY, JANUARY 14, 2014

[MA 330 Course Syllabus Spring 2014](#)

MA 330 Course Syllabus 2014

January 14, 2014

MA 330 Course Syllabus

Spring Semester 2014

Section 002

MWF 1100 - 1150

CB 343

1 Instructor

Prof. Richard Carey

O ce: POT 965

E-Mail richard.carey@uky.edu

Phone: (859) 257-3745

Office Hours: MW 4-5 and by appt.

2 Text

The text for the course is *The History Of Mathematics, An Introduction; Seventh Edition*, by David M. Burton. In addition there are multiple online references including the prominent MacTutor History of mathematics archive <http://www-groups.dcs.st-and.ac.uk/history/>; <http://convergence.mathdl.org/convergence/1/>; <http://personal.stevens.edu/nkahl/Top100Theorems.html>

3 Grading

Your course score will be the sum of presentation points (140), one take-home exam assignment (100), and a take-home final exam (130) The final grading scale for the course will be as follows: 333-370 A; 296-332 B; 259-295 C; 222-258 D; below 222 E.

The Final Exam is on Monday, May 5, 2014 in CB 349 at 3:30 pm.

Presentations: 70 points

You will complete a sequence of assignments culminating in a 15-pp. paper. The writing will be judged on the exposition of the mathematics (Is the problem well posed? In what way does it make sense? Is the solution valid and precise?) and on the quality and insight of your writing (Are the ideas clearly articulated? Has the subject matter been made interesting to the readers? Is the language precise? Are the ideas developed through details? Are there transitions guiding the reader from section to section? Is the whole acceptably free of grammatical errors? Has the work been carefully proofread?) Overall I will be looking for thoughtfulness (making insightful connections) on your part in the writing and presentations.

Research Topics Browse your textbook and the web to see what topics you're interested in pursuing. In your proposal, due at the beginning of week 4, rank order your top five. Here

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are some suggestions. From Geometry. Theory of Area; Three famous construction problems; history of the parallel postulate and Non-euclidean geometry; Bolyai -Lobachevsky formula relating the angle of parallelism and distance. From number theory. The fundamental theorem of arithmetic; Fermat's Christmas theorem; Fermat's Little theorem; Fermat's Last theorem; formula for the sum of k-th powers; The Law of Quadratic-Reciprocity; p-adic numbers; Diophantine equations, cryptology. From Algebra. Cubic and Quartic equations, solutions of higher order equations; algebra of quaternions; algebra of matrices, axiomatic algebra - groups,

rings and elds; mathematics of the search engine. From Calculus. Origins of calculus. Fundamental Theorem of calculus as exemplified by the theorems of Green, Stokes and Gauss; infinite series which leads to the formula $e^i + 1 = 0$: From probability. The law of large numbers, the central limit theorem.

A working bibliography (10 points). Your bibliography will list 5 of the best possible research sources (after a session with a math librarian.)

First paper(5 pp. draft, 20 points). This paper places a classic, mathematical problem in its biographical, and cultural contexts. This draft status. This draft will serve as your introduction to your larger paper.

Class presentation (20 points) In the paper and presentation, you will explain a classic problem and its solution. be prepared to use the chalkboard, handouts, power point etc. Before you actually give your presentation, we'll discuss your plans in a conference.

Third paper(5 pp. draft, 20 points) In this paper, you'll discuss implications for subsequent and current research (ie., what is the intrinsic interest to mathematics?). This draft will serve as the conclusion of your larger paper. The full paper will be awarded an additional maximum of 70 points.

4 Attendance Grading for the course will be influenced by class attendance. You will be allowed 4 unexcused absences, then for every missed class after that you will lose 10 points from the possible 370. I will let you know when roll begins.

5 Additional Course Policies

Course policy of academic accommodations due to disability: If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center

Course policy for attendance: See the above.

Make-up opportunities: The instructor shall give the student an opportunity to make up the work and/or the exam missed during an excused absence... implies the student shall not be penalized for the excused absence.

Verification of Absences: Students missing work due to an excused absence bear the responsibility of informing the instructor about their excused absence within one week following the period of the excused absence (except where prior notification is required) and of making up the missed work.

Course policy for submission of assignments: Students shall return all assignments on the due date. No late assignments shall be accepted without an excused absence.

Course policy on academic integrity: All assignments, projects, and exercises completed by students for this class should be the product of the personal efforts of the individual(s) whose

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name(s) appear on the corresponding assignment. Misrepresenting others work as ones own in the form of cheating or plagiarism is unethical and will lead to those penalties outlined in the University Senate Rules (6.3.1 and 6.3.2) at the following website: [http :](http://www.uky.edu/USC/New/rulesregulations/index.htm)

[http :
==www.uky.edu=USC=New=rulesregulations=index:htm:](http://www.uky.edu/USC/New/rulesregulations/index.htm)

The Ombud site also has information on plagiarism found at [http :
==www.uky.edu=Ombud:](http://www.uky.edu/Ombud)

Course policy on classroom civility and decorum: The university, college and department has a commitment to respect the dignity of all and to value differences among members of our academic community. There exists the role of discussion and debate in academic discovery and the right of all to respectfully disagree from time to time. Students clearly have the right to take reasoned exception and to voice opinions contrary to those offered by the instructor and/or other students (S.R. 6.1.2). Equally, a faculty member has the right - and the responsibility - to ensure that all academic discourse occurs in a context characterized by respect and civility. Obviously, the accepted level of civility would not include attacks of a personal nature or statements denigrating another on the basis of race, sex, religion, sexual orientation, age, national/regional origin or other such irrelevant factors. Please note Senate Rule 6.4.7.A.1 has changed. The Registrar will retain a record of the Letter of Warning for an academic offense. It will be available to third parties if the student authorizes its release or the specific record is requested as part of a court-ordered subpoena. In the past, the Registrar destroyed the record of the offense when the student graduated.

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POSTED BY [R.CAREY](#) AT 2:26 PM NO COMMENTS:

[MA 214 Course Syllabus Fall 2014](#)

MA 214 Course Syllabus Fall Semester 2014

**Section 004
MWF 0200 – 0250
CB 349**

1 Instructors

Prof. Richard Carey
Office: POT 965
E-Mail richard.carey@uky.edu
Phone: (859) 257-3745
Office Hours: MW 3:30-5 & by appt.
TA Nicholas Armenoff

2 Text

The text for the course is *Elementary Differential Equations, Tenth Edition*, William E. Boyce and Richard C. DiPrima, ISBN -978-0-470-03940-3. We will cover Chapter 1 (covered briefly) Chapter 2: 2.1-2.7 Chapter 3: 3.1-3.8 (all) Chapter 6: 6.1-6.6 (all) Chapter 5: 5.1-5.3

3 Grading

The course grade will be computed (with 90-100% A, 80-89% B, 70-79% C, 60-69% D, 0-59% E) on the basis of 435 points earned as follows:

2 in-class exams 100 points each

_____ quizzes and homework 100 points

1 final exam 135 points

The **Final Exam** is on Monday, December 15, 2014 in CB 349 at 1:00 pm.

4 Attendance

Grading for the course will be influenced by class attendance. You will be allowed 4 unexcused absences, then for every missed class after that you will lose 10 points from the possible 435. I will let you know when roll begins.

5 Help Sessions

The schedule for help sessions is as follows:

N.Armenoff :Office Hrs. 9-10 Monday in Mathskeller ; Wed/Fri in POT 906.

Tuesday 11:00-12:15 a.m., FPAT 253(N.Armendorff)

Note: FPAT refers to the F. Paul Anderson Tower located in central campus on the engineering quadrangle and is connected to the Raymond Building and the Robotics Building.

Tuesday 3:30-4:45 p.m., CB 201 (J. Zhuge)

Thursday 11:00-12:15 a.m., FPAT 253 (N.Armendorff)

Thursday 3:30-4:45 p.m., CB 201 (J. Zhuge)

5 Additional Course Policies

- Course policy of academic accommodations due to disability: If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center

(Room 2, Alumni Gym, 257-2754, email address jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

- Course policy for attendance: See the above.
- Make-up opportunities: The instructor shall give the student an opportunity to make up the work and/or the exam missed during an excused absence... implies the student shall not be penalized for the excused absence.
- Verification of Absences: Students missing work due to an excused absence bear the responsibility of informing the instructor about their excused absence within one week following the period of the excused absence (except where prior notification is required) and of making up the missed work.
- Course policy for submission of assignments: Students shall return all assignments on the due date. No late assignments shall be accepted without an excused absence.
- Course policy on academic integrity: All assignments, projects, and exercises completed by students for this class should be the product of the personal efforts of the individual(s) whose name(s) appear on the corresponding assignment. Misrepresenting others work as ones own in the form of cheating or plagiarism is unethical and will lead to those penalties outlined in the University Senate Rules (6.3.1 & 6.3.2) at the following website: http://www.uky.edu/USC/New/rules_regulations/index.htm. The Ombud site also has information on plagiarism found at <http://www.uky.edu/Ombud>.
- Course policy on classroom civility and decorum: The university, college and department has a commitment to respect the dignity of all and to value differences among members of our academic community. There exists the role of discussion and debate in academic discovery and the right of all to respectfully disagree from time to time. Students clearly have the right to take reasoned exception and to voice opinions contrary to those offered by the instructor and/or other students (S.R. 6.1.2). Equally, a faculty member has the right - and the responsibility - to ensure that all academic discourse occurs in a context characterized by respect and civility. Obviously, the accepted level of civility would not include attacks of a personal nature or statements denigrating another on the basis of race, sex, religion, sexual orientation, age, national/regional origin or other such irrelevant factors.

6. SUGGESTED SCHEDULE

Class	Date/Day	Activity
1	Aug--27 W	1.1--1.3 Introduction
2	Aug--29 F	1.1--1.3 Introduction
3	Sept--3 W	2.1 Linear equations/integrating factors
4	Sept--5 F	2.2 Separable equations
5	Sept--8 M	2.3 Modeling with first--order equations
6	Sept--10 W	2.4 Differences between linear and nonlinear equations
7	Sept--12 F	HW questions, etc.
8	Sept--15 M	2.5 Automomous equations

9	Sept--17 W	2.6 Exact equations
10	Sept--19 F	HW questions, etc.
11	Sept--22 M	2.7 Numerical approximations
12	Sept--24 W	3.1 Homogenous equations
13	Sept--26 F	HW questions, etc.
14	Sept--29 M	3.2 Solutions of homogeneous equations
15	Oct--1 W	3.3 Complex roots
16	Oct--3 F	HW questions, etc.
17	Oct--6 M	3.4 Repeated roots
18	Oct--8 W	Exam 1 review
19	Oct--10 F	Exam 1 (through 3.3)
20	Oct--13 M	3.5 Nonhomogeneous equations
21	Oct--15 W	3.6 Variation of parameters
22	Oct--17 F	HW questions, etc.
23	Oct--20 M	3.7 Mechanical and electrical vibrations
24	Oct--22 W	3.8 Forced vibrations
25	Oct-24 F	HW questions, etc.
26	Oct-27 M	6.1 Definition of the Laplace transform
27	Oct-29 W	6.2 Solution of initial value problems
28	Oct-31 F	HW questions, etc.
29	Nov-3 M	6.3 Step functions
30	Nov-5 W	6.4 DE's with discontinuous forcing functions
31	Nov-7 F	HW questions, etc.
32	Nov--10 M	6.5 Impulse functions
33	Nov--12 W	6.6 The convolution integral
34	Nov-14 F	HW questions, etc.
35	Nov--17 M	Exam 2 review
36	Nov--19 W	Exam 2 (3.4--6.6)
37	Nov-21 F	Review of power series(5.1- 5.2)
38	Nov-24 M	5.2 Series solutions near an ordinary point I
39	Dec-1 M	5.3 Series solutions near an ordinary point II
40	Dec-3 W	HW questions, etc.
41	Dec--5 F	5.4 Series solutions near a singular point

42	Dec--8 M	5.4 Series solutions near a singular
point		
43	Dec--10 W	Final exam review
44	Dec--12 F	Final exam review
45	Dec--15 M	Final exam 1:00 Room 349