

Penn State University - University Park
MATH 140A, Calculus, Analytic Geometry, Algebra & Trigonometry
Spring 2009

CATALOG DESCRIPTION: MATH 140A (GQ) Calculus, Analytic Geometry, Algebra, and Trigonometry (6) Review of algebra and trigonometry; analytic geometry; functions; limits; derivatives, differentials, applications; integrals, applications. Students may only take one course for credit from MATH 110, 140, 140A, 140B, 140E, 140G, and 140H.

PREREQUISITE: 3-4 years of HS math including trigonometry with satisfactory performance on the FTCAP exam, or satisfactory performance on the algebra and trigonometry math proficiency examination.

TEXT: *Calculus (Single Variable)*, Sixth Edition, (OR) *Calculus*, Sixth Edition, by James Stewart, published by Thomson (Brooks/Cole). An electronic version of the text (e-text) is available chapter by chapter through <http://pennstate.ichaptersites.com>

COURSE FORMAT: There are three 50-minute lectures (MWF) and two 75-minute lectures (TR) each week. The sections covered in lectures are listed at the end of this syllabus.

MATH 140A LEARNING OBJECTIVES :

Upon successful completion of Math 140A, the student should be able to:

1. Use algebra concepts and techniques required in calculus topics.
2. Use trigonometry concepts and techniques required in calculus topics
3. Calculate or estimate limits of functions given by formulas, graphs, or tables.
4. Determine whether a function given by a graph or formula is continuous at a given point or on a given interval or on its domain.
5. Determine whether a function given by a graph or formula is differentiable at a given point or on a given interval.
6. Distinguish between average and instantaneous rate of change and interpret the definition of the derivative graphically.
7. Determine derivatives of some functions using the limit definition of the derivative.
8. Calculate derivatives of polynomial, rational, and common transcendental functions, and combinations of these functions.
9. Calculate derivatives of composite functions.
10. Calculate derivatives of implicitly defined functions.
11. Give examples to illustrate important theorems.
(Intermediate Value Thm, Rolle's Thm, Mean Value Thm, Extreme Value Thm, Squeeze Thm)
12. Apply the ideas and techniques of derivatives to related rate problems.
13. Apply the ideas and techniques of derivatives to finding local and absolute extrema.
14. Apply the ideas and techniques of derivatives to graphing functions.
15. Apply the ideas and techniques of derivatives to optimization problems.
16. Find linear approximations of functions (differentials).
17. Calculate the Riemann sum for a given function and partition.
18. Describe a definite integral as the limit of a Riemann sum.
19. Determine antiderivatives of some algebraic functions and some trigonometric functions.
20. Calculate values of definite integrals using antiderivatives and areas.
21. Use the Fundamental Theorem of Calculus to determine the derivative of an integral.
22. Use the Fundamental Theorem of Calculus to evaluate definite integrals.
23. Apply substitution techniques to integrate functions.
24. Apply the ideas of definite integrals to calculate the area of a region between curves.
25. Apply the ideas of definite integrals to calculate the volume of a solid of revolution rotated about a coordinate axis.
26. Apply the ideas of definite integrals to calculate the volume of a solid of revolution rotated about a line parallel to a coordinate axis.

CALCULATORS: A graphics calculator is useful as a study and learning tool when used appropriately, but it is not essential. Calculus is a collection of ideas that is not mastered through calculator skills. No calculators are allowed on quizzes, midterms, or on the final examination.

TUTORS AND MATH CENTER: Free mathematics tutoring is available at the Math Center located in 220 Boucke Building. For more information, go to the [Math Center](#) webpage. If you need extra help, a (paid) tutors list maintained by the Mathematics Department Undergraduate Office is available on-line at <http://www.math.psu.edu/ug/PrivateTutorList.htm>.

EXAMINATIONS: Three 75-minute evening examinations will be given during the semester and a comprehensive final examination will be given during the final examination period. NO books, notes, or calculators may be used on the examinations. You must bring your University ID card to all exams. The examinations will be given from 6:30 to 7:45 PM on the following dates:

Midterm Examination I	Wednesday, February 4
Midterm Examination II	Wednesday, March 4
Midterm Examination III	Thursday, April 2

Rooms for the examinations will be announced by your instructor at a later date and may also be found on the bulletin board outside 104 McAllister.

CONFLICT EXAMINATIONS: For the two mid-semester examinations, there is a conflict examination from 5:05 PM to 6:20 PM on the same night as the regular examination.

Who may take the Conflict Exam? If you have a valid conflict with the regular examination time, such as a class or other scheduled activity, you may sign up for the conflict exam.

How and when to sign up for the Conflict Exam. Students must sign up for the Conflict Exam **in class, with your instructor, on a pink form**. The student is responsible for knowing the room and time of the conflict examination. This information is on top of the pink form. Your instructor must turn in the pink form **2 class days** prior to the examination date. If you have not signed up with your instructor, you will not be allowed to take the conflict exam.

Instructions for Conflict Exam night. The student is responsible for knowing the room and time of the conflict examination. **Students must bring their University ID to the conflict examination.** The ID will be checked by the proctor. **Although the conflict examination will end at 6:20 PM, no student will be permitted to leave the examination room before 6:25 PM.** Any student who leaves before 6:25 PM will receive a grade of zero on the examination and will not be allowed to retake it.

MAKEUP EXAMINATIONS: There will be no makeup examinations for students in Math 140A. If a student must miss the regularly scheduled examination and the conflict examination with a valid excuse, the score will be taken as the average percents of the exams surrounding that exam. For example, if a student must miss Exam 2, the average of Exam 1 and Exam 3 will be the score for Exam 2.

FINAL EXAMINATION: The final examination will be given during the week, May 4-8, 2009. **The final examination may be scheduled on any day during the final examination period. Do not plan to leave University Park until after Friday, May 8, 2009.** Students may access their final exam schedule Monday, February 16, through their e-lion account. Notification of conflicts is given on the student's final exam schedule. There are two types of conflict examinations, direct and overload. Direct conflicts are two examinations scheduled at the same time. Overload examinations are three or more examinations scheduled within a fifteen hour period, from the beginning of the first examination to the beginning of the third examination. Students may elect to take the three or more examinations on the same day if they wish or request a conflict final examination. **A student must take action to request a conflict exam through e-lion between February 16 and March 8. Conflict final examinations cannot be scheduled through mathematics department, and there will be no sign up sheet in 104 McAllister for the final conflict examination** Students who miss both the regular and conflict final examinations due to a valid and documented reason, such as illness, may be allowed to take a makeup final examination. If the student does not have a valid reason, at least a 30-point penalty will be imposed. All such makeup examinations must be arranged through the instructor with the approval of the course coordinator, and students in such a situation should contact their instructor within 24 hours of the scheduled final examination. Students who have taken the original final examination are not permitted to take a makeup examination.

LATE-DROP: Students may add/drop a course without academic penalty within the first ten calendar days of the semester. A student may late drop a course within the first twelve weeks of the semester but accrues late drop credits equal to the number of credits in the dropped course. A baccalaureate student is limited to 16 late drop credits. The late drop deadline for Spring 2009 is **April 10, 2009**.

GRADES: Your course grade will be determined by your exam scores and a homework/quiz score (labeled "QZ" by Testing Services).

Total possible points follow:

Examination I	100
Examination II	100
Examination III	100
Homework and/or quizzes	150
Final Examination	150
Total	600

The exact point requirements for each letter grade will be decided at the end of the course.

A typical distribution follows:

Grade	%-score	Points
A, A-	90-100	540-600
B+, B, B-	80-89	480-539
C+, C	70-79	420-479
D	60-69	360-419
F	0-59	0-359

After the third exam and before the late-drop deadline the guaranteed grade-line cutoffs for the major grades (A, B, C, D, F) will be provided to facilitate your planning for the rest of the semester. The +/- grade-lines will be assigned after the final exam. The unavoidable consequence is that some students are just "a point" away from the higher grade. For the reason of fairness, the policy in this course is to NOT adjust individual grades in such circumstances.

NOTE: Your grade will be based **EXCLUSIVELY** on the midterm examinations, homework and/or quizzes and final examination. **There is no "extra-credit" work.**

DEFERRED GRADES: Students who are unable to complete the course because of illness or emergency may be granted a deferred grade which will allow the student to complete the course within the first six weeks of the following semester. If the student is scheduled for Math 141, then the student must complete Math 140 or 140A within 2 weeks of the following semester. Note that deferred grades are limited to those students who can verify and document a valid reason for not being able to take the final examination. For more information see, [DF grade](#).