# MATH 140
## Calculus With Analytic Geometry I
### Sample Syllabus

## Description

Calculus is an important building block in the education of any professional who uses quantitative analysis. This course introduces and develops the mathematical skills required for analyzing change and creating mathematical models that replicate real-life phenomena. The goals of our calculus courses include to develop the students' knowledge of calculus techniques and to use the calculus environment to develop critical thinking and problem solving skills. The concept of limit is central to calculus; MATH 140 begins with a study of this concept. Differential calculus topics include derivatives and their applications to rates of change, related rates, linearization, optimization, and graphing techniques. The Fundamental Theorem of Calculus, relating differential and integral calculus begins the study of Integral Calculus. Antidifferentiation and the technique of substitution is used in integration applications of finding areas of plane figures and volumes of solids of revolution. Trigonometric functions are included in every topic.

## Prerequisite

Math 22 AND 26; or Math 40 or Math 41; or satisfactory performance on the algebra and trigonometry math proficiency examination.

## Objectives

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

- Calculate or estimate limits of functions given by formulas, graphs, or tables.
- 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.
- Determine whether a function given by a graph or formula is differentiable at a given point or on a given interval.
- Distinguish between average and instantaneous rate of change and interpret the definition of the derivative graphically.
- Determine derivatives of some functions using the limit definition of the derivative.
- Calculate derivatives of polynomial, rational, and common transcendental functions, and combinations of these functions.
- Calculate derivatives of composite functions.
- Calculate derivatives of implicitly defined functions.
- Give examples to illustrate important theorems. (Intermediate Value Thm, Rolle’s Thm, Mean Value Thm, Extreme Value Thm, Squeeze Thm).
- Apply the ideas and techniques of derivatives to related rate problems.
- Apply the ideas and techniques of derivatives to finding local and absolute extrema.
- Apply the ideas and techniques of derivatives to graphing functions.
- Apply the ideas and techniques of derivatives to optimization problems.
- Find linear approximations of functions (differentials).
- Calculate the Riemann sum for a given function and partition.
- Describe a definite integral as the limit of a Riemann sum.
- Determine antiderivatives of some algebraic functions and some trigonometric functions.

- Calculate values of definite integrals using antiderivatives and areas.
- Use the Fundamental Theorem of Calculus to determine the derivative of an integral.
- Use the Fundamental Theorem of Calculus to evaluate definite integrals.
- Apply substitution techniques to integrate functions.
- Apply the ideas of definite integrals to calculate the area of a region between curves.
- Apply the ideas of definite integrals to calculate the volume of a solid of revolution rotated about a coordinate axis.
- Apply the ideas of definite integrals to calculate the volume of a solid of revolution rotated about a line parallel to a coordinate axis.
- Synthesize concepts from two or more separate sections of the text.

## Textbook

Calculus, Seventh Edition, (OR) Calculus(Single Variable), Seventh Edition, by James Stewart, published by Thomson (Brooks/Cole). ISBN13: 978-0-538-49781-7 (OR) ISBN13: 978-0-538-49783-1 eBook options available from Cengage Learning.

## 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. Therefore, NO calculators are allowed on exams.

## Exams

Two 90-minute examinations will be given during the semester and a comprehensive final exam will be given at the end of the semester. All three of these exams are proctored exams.

## Grading

| Assignment | Points |
|---|---|
| Exam 1 | 100 |
| Exam 2 | 100 |
| Homework / Quizzes / Participation | 100 |
| Final Exam | 150 |
| Total | 450 |

## Grading Scale

| Letter Grade | % Score | Total Points |
|---|---|---|
| A | 92-100% | 412-450 |

| | | |
|---|---|---|
| A- | 90-91% | 403-411 |
| B+ | 87-89% | 390-402 |
| B | 83-86% | 372-389 |
| B- | 80-82% | 358-371 |
| C+ | 77-79% | 345-357 |
| C | 70-76% | 313-344 |
| D | 60-69% | 268-312 |
| F | 0-59% | 0-267 |

## Examity

In this class you may take your tests remotely and they will be proctored by a service called Examity®. Please log in as soon as possible to set up your profile. You will not be able to schedule exams until your profile is complete. Examity® system requirements are:

- Desktop computer or laptop (tablets, Chromebook and cell phones do not meet our requirements).
- Webcam and microphone (built-in or external).
- Connection to network with sufficient internet speed: at least 2 Mbps download speed and 2 Mbps upload.
- Operating systems: Windows XP–Windows 10, Mac OS X 10.8 (Mountain Lion)–10.11 (El Capitan).
- Browser with pop-up blocker disabled: Google Chrome v39 or later, Mozilla Firefox v34 or later, Internet Explorer v8 or later, Microsoft Edge, Apple Safari v6 or later.

After you create your Examity profile, you will have the option to schedule proctoring times for each of your exams. On the day of your exam, go to your Examity dashboard using the single sign-on link and select the ‘Start Exam’ button to meet the proctor.

## Examity Proctors

Examity’s proctors are highly-trained individuals who go through a rigorous process of selection, including background checks and comprehensive training. All proctors have a college degree, advanced technical and communication skills, and have completed online courses.

## Proctoring Terms of Service

This course may require you to take exams using certain proctoring software that uses your computer’s webcam or other technology to monitor and/or record your activity during exams. The proctoring software may be listening to you, monitoring your computer screen, viewing you and your surroundings, recording and storing any and all activity (including visual and audio recordings) during the proctoring process. By enrolling in this course, you consent to the use of the proctoring software selected by your instructor, including but not limited to any audio and/or visual monitoring which may be recorded. Please contact your instructor with any questions.

This information is provided by Penn State World Campus

If you have any technical questions or concerns, contact Examity's support team 24/7 via email or phone at (855) 392-6489.

## Academic Integrity

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

## Accommodating Disabilities

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The Student Disability Resources (SDR) website provides contact information for every Penn State campus . For further information, please visit Student Disability Resources website.

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines . If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

## Counseling and Psychological Services

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

- Counseling and Psychological Services at University Park (CAPS): 814-863-0395
- Counseling and Psychological Services at Commonwealth Campuses
- Penn State Crisis Line (Available 24 hrs, 7 days a week): 877-229-6400
- Crisis Text Line (Available 24 hrs, 7 days a week): Text LIONS to 741741

## Educational Equity / Report Bias

Penn State takes great pride to foster a diverse and inclusive environment for students, faculty, and staff. Acts of intolerance, discrimination, or harassment due to age, ancestry, color, disability, gender, gender identity, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity via the Report Bias website.