Syllabus For Calculus I-50:640:121:01

Fall 2022

Textbook: Calculus (8th-edition) by James Stewart. Publisher: Cengage Learning, 2016.

Description. This four-credit course is the first of the three-course Calculus series. It covers Chapters 1-6 of the textbook. Topics include: Limits (including algebraic, trigonometric limits, limits at infinity), the Intermediate Value Theorem, differentiation rules (including the chain rule), derivatives of elementary functions, higher derivatives, implicit differentiation, linear approximation, extreme values, mean value theorem and its consequences to monotonicity and critical points. Applications to optimization. Antiderivatives, the Riemann integral, Fundamental Theorem of Calculus I-II, integration by substitution. Applications: area between curves, volumes. Differential and integral calculus of exponential and logarithmic functions. LHôpitals rule, inverse trigonometric functions, and hyperbolic functions.

Objective. By the end of this course, students will be able to: (1) Understand the concept of the limit and evaluate the limit of a function in a variety of ways (graphically, numerically, algebraically). (2) Analyze and apply the notion of continuity of a function. (3) Understand the concept of the derivative of a function and to be able to compute the derivative of a function using the definition or differentiation formulas. (4) Apply the derivative to solve problems in various contexts, including curve sketching, rate of change, related rates and optimization. (5) Understand the relationship between the area under the curve and the definite integral. (6) Understand the relationship between integrals in general and antiderivatives via the Fundamental Theorem of Calculus.

Instruction Plan. This is an in-person class. However, Canvas, Zoom, emails and other digital tools will be used to aid the instruction and communication. Students are expected to have access to: (1) high speed internet; (2) a laptop/desktop computer or a tablet/iPad together with built-in or separate microphone; (3) a scanner, or a phone camera with an app for producing pdf documents.

Class Information.

- Instructor: Siqi Fu

- Office: BSB 426

- Office hours: MW 2:30 pm-3:30 pm (in-person or through Zoom) or by appointments

- Phone: (856) 225-2349.

- E-mail: sfu@camden.rutgers.edu

- Web page: http://people.camden.rutgers.edu/sfu.

- Lectures: ATG-208, MW 12:30 am-2:20 pm

- Teaching Assistant: Samantha Moroney, sfm96scarletmail.rutgers.edu

Assessment. There will regular homework assignments and occasional quizzes. Students are asked to submit their work through Canvas Assignments. There will also be two in-class midterm tests and a comprehensive final exam.

Grades will be assigned based on students' performance in the assignments, mid-term tests, and the final exam. Your course grade will be determined according to the following weights:

- Attendance, quizzes, and homework assignments: 20%

- Test I (Wednesday, 10/12/2022): 25%

- Test II (Wednesday, 11/16/2022): 25%

- Final Exam (Monday, 12/19/2022): 30%

Attendance Policy. Attendance will be checked and is expected for every class period with exception for illness, court appearance, and other legitimate emergency. See the Rutgers University Attendance Policy.

Code of Conduct and Academic Integrity Rutgers University-Camden seeks a community that is free from violence, threats, and intimidation; is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and does not threaten the physical or mental health or safety of members of the University community, including in classroom space, and a community in which students respect academic integrity and the integrity of your own and others work.

As a student at the University you are expected adhere to the Student Code of Conduct and Academic Integrity Policy. Please review the Academic Integrity Policy and Code of Conduct.

Students with Disabilities. If you are in need of academic support for this course, accommodations can be provided once you share your accommodations indicated in a Letter of Accommodation issued by the Office of Disability Services (ODS). If you have already registered with ODS and have your letter of accommodations, please share the letter with this instructor early in the course. If you have not registered with ODS and you have or think you have a disability (learning, sensory, physical, chronic health, mental health or attentional), please contact ODS by first visiting their website.The website will further direct you who to contact and how to contact them depending on the free, confidential services you are in need of. Please Note: Accommodations will be provided only for students with a Letter of Accommodation from ODS. Accommodation letters only provide information about the accommodation, not about the disability or diagnosis.

Health and Well-Being Protocols. You are expected to follow Rutgers University's Health and Well-Being and COVID-19 Protocols. Please referee to the website https://coronavirus.rutgers.edu/fall-semester-2022-health-and-well-being-protocols for details.

Tentative Schedule. This schedule is subject to change. Not all suggested homework problems are collected. Homework assignments will be posted on the course Canvas site with specified due dates.

Lecture	Sections	Topics	Suggested Homework Problems
1(9/7)	1.1	Functions	3, 10, 13, 21, 32, 43, 56, 72, 79
	1.2	Mathematical Model	2, 4, 5, 15, 21, 27, 30
	1.3	Construction of functions	2, 3, 4, 15, 26, 31, 52
2(9/12)	1.4	Tangent and Velocity	1, 5, 7
	1.5	Limit of a function	1, 3, 5, 8, 11, 19, 22, 33, 50
3(9/14)	1.6	Calculating limits	1, 2, 5, 12, 17, 18, 24, 25, 26, 36, 40, 50
	1.7	Precise definition of a limit (optional)	1, 3, 7, 11, 32, 37 (optional)
4(9/19)	1.8	Continuity	2, 6, 8, 9, 10, 11, 21, 23, 46, 53, 54
5(9/21)	3.4	Limit at infinity	2, 6, 7, 11, 14, 18, 25
6(9/26)	2.1	Rate of Change and Derivative	3, 6, 11, 14, 18, 22, 23, 33, 40, 48
	2.2	Derivative as a function	1, 3, 14, 24, 33, 35, 40, 50, 60
7(9/28)	2.3	Differential formulas	5, 8, 14, 18, 24, 26, 58, 60, 78, 101
8(10/3)	2.4	Derivative of trigonometric functions	7, 9, 21, 22, 28, 33, 41, 42, 43, 51
	2.5	Chain Rule	4, 7, 12, 24, 44, 53, 54, 62, 67, 70
9(10/5)	2.6	Implicit differentiation	3, 10, 18, 22, 25, 28, 32
10(10/10)		Catch up and Review for Midterm Exam 1	
11(10/12)		Midterm Exam 1	
12(10/17)	2.7	Rate of change in natural and social sciences	1, 5, 20, 29, 44
	2.8	Related rates	7, 13, 15, 17, 19, 25, 33
13(10/19)	2.9	Linear approximation	2, 3, 25, 26
	3.1	Maximum and minimum values	5, 10, 27, 31, 37, 48, 54, 55
14(10/24)	3.2	The mean value theorem	6, 11, 12, 19, 22, 26, 31
	3.3	Derivatives and shape of the graph	8, 11, 15, 26, 31, 34, 40
15(10/26)	3.5	Graph sketching	1, 13, 22, 28, 29, 35, 40, 49
16(10/31)	3.7	Optimization problems	3, 6, 12, 14, 16, 22, 51, 60
17(11/2)	3.9	Antiderivative	12, 14, 18, 21, 28, 37, 38, 54, 56
	4.1	Area and distance	5, 13, 18
18(11/7)	4.2	Definite integral	4, 5, 6, 8, 19, 34, 38, 48, 57
19(11/9)	4.3	Fundamental theorem of calculus	7, 11, 17, 27, 28, 34, 38, 42, 66
	4.4	Net change	7, 14, 33, 36, 41, 42, 45, 47, 56, 58
20(11/14)		Catch up and Review for Midterm Exam 2	
21(11/16)		Midterm Exam 2	
22(11/21)	4.5	Substitution	6, 10, 16, 17, 21, 24, 28, 38, 44, 51
23(11/28)	5.1	Area between curves	1, 6, 14, 23, 27, 29, 31, 40, 50
	5.2	Volumes	1, 4, 11, 15, 32, 40, 55
24(11/30)	6.1	Inverse functions	20, 21, 25, 28, 29, 32, 37, 42, 88
	6.2	Exponential functions and their derivatives	4, 12, 13, 16, 26, 29, 31, 42
	6.3	Logarithmic functions	1, 3, 9, 18, 23, 45, 48, 52, 53
25(12/5)	6.4	Derivatives of logarithmic functions	3, 12, 20, 26, 61, 70
	6.6	Inverse trigonometric functions	1, 10, 18, 25, 32, 35, 47, 59, 63, 67
26(12/7)	6.8	Indeterminate forms and l'Hospital's Rule	1, 8, 12, 14, 32, 38, 44, 52, 57, 67
27(12/12)		Catchup	
28(12/14)		Catchup and review for the Final	
Final(12/19)		Comprehensive Final from 11:30am-2:20pm	