UMass Boston 2017-09-11 12:21
Department of Mathematics
Math 140 - Calculus I
Fall 2017

Course Name: Math 140: Calculus I (4 credits)

Section: Section 09 - WISER Class Number: 5003

Description: Math 140 (Calculus I) is the first course in the sequence of calculus courses for science and math majors. The focus will be both on understanding mathematical concepts and techniques, and on applying this knowledge into other fields. We will study limits and continuity, derivatives and their applications, we will begin the study of definite and indefinite integrals with applications to geometric and physical problems.

Pre-requisites: A grade of B or better (not a B-) in Math 130 OR a score of 74% or better on the ALEKS Math Placement test. Admission to the course is contingent upon satisfying the pre-requisites. The rule is strictly enforced: if you don't have the prerequisites, the department will drop you from the course.

Schedule: TuTh 10:25am - 12:15pm in M-1-428. For every hour in class, you should dedicate three additional hours studying for this course. Students should not make any travel plans that would require them to leave before Sunday, December 24, 2017.

Textbook: Single Variable Calculus, 7th edition, by Stewart.
ISBN-13: 978-0538497831, ISBN10: 0538497831
Copies of the book will be placed on reserve at the library.

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Office hours: **By appointment**: TuTh 9:50am-10:20am and 4:00pm - 4:30pm in S-03-091. Please use the online form at `http://catazara.youcanbook.me/` to schedule a 10 or 20 minute appointment, at least 2 hours in advance. You can stop by without a confirmed appointment, but I may be unavailable.

Assignments: *Exams*: There will be two in-class exams (tentatively Oct 10th and Nov 14th), plus a cumulative final during the final exam period. Make-up exams will be allowed only with an official excuse. In all other situations, a missed exam will get a score of zero. Calculators will not be needed/allowed on exams.
Your performance on exams will be the primary evidence that you have understood the material, and will be the dominant criterion in assigning the final grade. A list of suggested practice problems is provided; those review problems will help you prepare for the exam, but by no means should you think that exam problems will be taken from that list only. The exams will be closed-book exams. Please let me know as soon as possible of any conflicts in exam dates.

Quizzes: Almost every Thursday, at the end of class, there will be a 10-minute quiz on the topics covered the previous week. There will be no make-up quizzes, but the lowest two scores will not be counted.

Homework: For each section you will have an online problem set, using WeBWorK: `https://webwork2.umb.edu/webwork2/m140-cz/`. Homework will normally be due each Tuesday evening. Late homework will be penalized.
Mathematics knowledge can not be achieved simply by attending lectures. Consider homework as an opportunity to practice. By working on the assigned problems, you get a confirmation that you have understood the concepts and techniques, or you identify the areas where you still have difficulties. Address all difficulties as soon as possible: a problem ignored is not a problem solved. On the contrary, a postponed small problem usually grows into a more serious one. Feel free to work in groups, but make sure you know how to solve every single problem: exams are individual, and they count much more towards your grade than the problem sets.

Readings: You are required to read the textbook section before it is discussed in class. Reading the text will help you better participate and understand the lecture and have an idea of the important concepts before you see them in class.

Grading: In order to move on to Calculus 2, you need at least a C- in Calculus I.

Exam 1: 100 points	A : 90%
Exam 2: 100 points	B : 80%
Final exam: 200 points	C : 70%
Quizzes: 100 points	D : 60%
Homework: 100 points	

Attendance: Regular class attendance is required and active class participation is expected. Students are responsible for material and announcements missed due to an absence. Please come to class on time and turn off your cell phone before the class begins.

Student conduct: Students are required to adhere to the University Policy on Academic Standards and Cheating, to the University Statement on Plagiarism and the Documentation of Written Work, and to the Code of Student Conduct as delineated in the University Catalog and Student Handbook. The Code is available online: `http://www.umb.edu/life_on_campus/policies/community/code`

Special accommodations: Section 504 of the Americans with Disabilities Act of 1990 offers guidelines for curriculum modifications and adaptations for students with documented disabilities. If applicable, students may obtain adaptation recommendations from the Ross Center for Disability Services, Campus Center, UL Room 211, (617-287-7430). The student must present these recommendations and discuss them with each professor within a reasonable period, preferably by the end of Drop/Add period. (Tuesday, Sep 12, 2017).

Expectations: Students enrolled in this course are expected to be:

- Motivated and disciplined;
- Adequately familiar with background material;
- Committed and actively involved in their own learning;
- Able to work in groups;
- Secure enough to ask for help.

Goals: By fully participating in all course activities, students should be able to:

- Understand the fundamental concepts of calculus
- Demonstrate ability to use calculus to solve problems
- Build and improve analytical and communication skills
- Appreciate the beauty and power of Mathematics

Additional help: Academic Support Programs offers a variety of tutoring and tutorial formats to support students in their undergraduate and graduate coursework. The Math Resource Center offers tutoring in mathematics, computer science, and information technology, either in one-on-one or in group format. More information is available at
`http://www.umb.edu/academics/vpass/academic_support/tutoring/`

We will be using Piazza for class discussion. Rather than emailing questions to me, I strongly encourage you to post your questions on Piazza. If you have any problems accessing the site or you have feedback for the developers, email team@piazza.com. Find our class page at:
`https://piazza.com/umb/fall2017/math140/home`

Changes: Any changes or class cancellations will be announced in class or by e-mail or will be posted online. Course materials and announcements are posted on the piazza account: `https://piazza.com/umb/fall2017/math140`

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Tentative schedule

Dates	Topics	Comments
Sep 5, 7	Introduction. Functions(1.1). Catalog of functions (1.2). Operations with functions (1.3).	
Sep 12, 14	Tangents and velocity (1.4) Limit of a function (1.5). Limit laws (1.6).	Add/drop: Sep. 12
Sep 19, 21	Continuity (1.8). Derivatives and rates of change (2.1). The derivative as a function (2.2)	
Sep. 26, 28	Differentiation formulas (2.3). Derivatives of trig functions (2.4). Chain rule (2.5)	
Oct 3,5	Inverse functions (6.1). Derivatives of exponentials (6.2). Logarithmic functions (6.3). Derivatives of logarithmic functions (6.4).	
Oct 10, 12	Review. Exam #1. Implicit differentiation (2.6).	Exam #1: Oct 10
Oct 17, 19	Rates of change in physical and social sciences (2.7). Related rates (2.8). Linear approximation and differentials (2.9).	
Oct 24, 26	Newton's method (3.8). Maximum and minimum values (3.1). The Mean Value Theorem (3.2).	
Oct 31, Nov 2	How derivatives affect the shape of a graph (3.3). Limits at infinity and horizontal asymptotes (3.4). Summary of curve sketching (3.5).	
Nov 7, 9	Optimization problems (3.7). Antiderivatives (3.9). Areas and distance (4.1).	
Nov 14, 16	Review. Exam #2. Definite integrals (4.2).	Exam #2: Nov 14.
Nov 21		PWF: Nov 22
Nov 28, 30	The Fundamental Theorem of Calculus (4.3). Indefinite integrals and the net change theorem (4.4). The substitution rule (4.5)	
Dec 5, 7	Area between curves (5.1). Volume of solids of revolution (5.2)	
Dec 12	Review	
Dec xx	Final Exam	

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A Brief Introduction to WeBWorK

WeBWorK (Online Homework System):
`https://webwork2.umb.edu/webwork2/m140-cz/`
`http://webwork.maa.org/wiki/Category:Students`

(1) Go to `https://webwork2.umb.edu/webwork2/m140-cz/` [Ignore the security warnings: the site is safe!]

(2) Login using your UMB email username and your UMB student ID as password. For example, if your UMB email is John.Smith001@umb.edu and your UMB student ID is UMS087654321, then your username is john.smith001 and your initial password is ums087654321 (all **lowercase**).

(3) Click on the **Password/Email** button (top left corner). Change your password. Type your current email address. Click on **Change User Options**. After receiving the confirmation message(s) in green, click on the Sets button (top left corner).

(4) Select the first problem set and download a hardcopy (select PDF). You will need the Adobe Acrobat Reader to do this. Open the file and print it. At this point you no longer need to be connected.

(5) Work the problems, and when you have the answers (all, or just some of them), reconnect to WeBWorK, with your new password.

(6) Click on the first problem set link, then on **Problem 1**. Navigate through the problems, either by clicking on **Next** or directly on the problem numbers on the left. Type your answers in the spaces provided. Be very careful with brackets.

(7) Click on **Preview Answers**. If what you see is what you wanted your answer to look like, click **Submit Answers**. If not, correct your input, and preview again, until you get the desired form.

(8) After you submit the answer(s) for each problem, WeBWorK tells you which answers are correct / incorrect. You can fix the incorrect answer(s) now, or you can return to this problem later. Your answers are saved, and WeBWorK will remember them when you login later.

(9) Click on **Next** to go to the next problem, or on **Prob. List** to see the list of all problems in this problem set, if you want to jump to another problem.

(10) When you finish the session, click on **Logout**.

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Recommended Practice Problems

From Stewart: Single Variable Calculus, 7th edition.
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1.4 The tangent and velocity problems	# 1, 3, 5, 7, 9;
1.5 The limit of a function	# 5, 7, 11, 17, 21, 23, 31, 33;
1.6 Calculating limits using limit laws	# 1, 2, 7, 21, 31, 37, 49, 57;
1.8 Continuity	# 3, 9, 19, 21, 35, 43, 45, 51, 65, 69;
2.1 Derivatives and rates of change	# 3, 5, 11, 13, 17, 21, 29, 37, 43, 47;
2.2 The derivative as a function	# 3, 5, 13, 25, 27, 35, 43;
2.3 Differentiation formulas	# 7, 17, 27, 41, 43, 63, 67, 71, 87, 97;
2.4 Derivatives of trig functions	# 9, 13, 23, 29, 35, 37, 45, 51;
2.5 Chain rule	# 5, 17, 21, 27, 47, 61, 63, 65, 69, 73;
2.6 Implicit differentiation	# 5, 15, 21, 29, 37, 43, 51, 57;
2.7 Rates of change in physical and social sciences	# 1, 5, 7, 15, 19, 23, 28, 31;
2.8 Related rates	# 5, 9, 11, 13, 15, 25, 31, 45;
2.9 Linear approximation and differentials	# 3, 9, 13, 17, 23, 31, 33, 41;
3.1 Maximum and minimum values	# 3, 9, 25, 37, 39, 47, 57, 61;
3.2 The Mean Value Theorem	# 3, 5, 7, 9, 19, 23, 25, 27;
3.3 How derivatives affect the shape of a graph	# 1, 5, 11, 15, 21, 27, 37, 49, 52, 61;
3.4 Limits at infinity and horizontal asymptotes	# 3, 7, 17, 19, 29, 35, 47, 55;
3.5 Summary of curve sketching	# 5, 11, 17, 35, 53;
3.7 Optimization problems	# 3, 5, 9, 11, 15, 19, 35, 43, 51, 59;
3.8 Newton's Method	# 5, 7, 13, 17, 27;
3.9 Antiderivatives	# 7, 13, 15, 19, 27, 35, 41, 43, 51, 57;
4.1 Areas and distance	# 1, 5, 7, 13, 17;
4.2 Definite integrals	# 1, 5, 7, 9, 17, 33, 37, 49, 51, 57;
4.3 The Fundamental Theorem of Calculus	# 3, 5, 13, 17, 21, 27, 33, 53, 59, 68;
4.4 Indefinite integrals and the net change theorem	# 3, 9, 13, 29, 39, 45, 49, 55, 61, 63;
4.5 The substitution rule	# 3, 7, 15, 21, 29, 41, 45, 53, 55, 59;
5.1 Area between curves	# 1, 5, 9, 13, 19, 23, 27, 43, 45, 53;
5.2 Volume of solids of revolution	# 3, 9, 11, 19, 27, 41, 43, 45, 47, 55;
6.1 Inverse functions	# 3, 5, 15, 21, 31, 37, 41, 45;
6.2 Derivatives of exponentials	# 5, 13, 25, 35, 41, 51, 53, 61, 73, 83, 89, 93;
6.3 Logarithmic functions	# 3, 7, 17, 29, 45, 51, 61, 67;
6.4 Derivatives of logarithmic functions	# 9, 15, 21, 29, 37, 49, 55, 61, 65, 73, 77, 79;