Calculus I - Math 172 (5 credits) – **Fall 2018**

Instructor: Dr. Brent Hancock
Office Location: Samuelson 218E **Email:** brent.hancock@cwu.edu
Class times: Class MTWRF 8:00-8:50am, Samuelson 130
Office hours: MTWR 9:00-10:00 am, or by appointment (send me an email to set up a time)

- Office hour visits: Plan ahead and bring your prior work so I can best assist you ☺

What you will need:

- *Textbook: Calculus, 3rd Edition (Early Transcendentals)* by Rogawski and Adams, ISBN-13: 978-1-319-05341-3
- Some kind of graphing calculator (TI-83, 84, or similar)
- Access to Canvas online at http://canvas.cwu.edu (this is where I will post course handouts, grades, policies, announcements etc. so it is important that you log on regularly).

What you will learn (a more complete list of objectives follows on a later page):
By the end of this course, you will develop calculus skills that will enable you to:

- compute derivatives of mathematical functions
- use the derivative to find critical points and rates of change and optimize quantities
- apply derivatives to mathematical models to answer real-world questions
- explain real-world meanings of derivatives

Where else you can get help:

- University Math Center (Brooks Library 190; see http://www.cwu.edu/learning-commons/university-math-center)
- Yourself (extra examples, read the book, watch online videos, etc.)
- Each other (study groups, etc.)

What you need to do to succeed in this class:

- Participate in class
- Form study groups and work together
  - … but submit your own work
- Understand what constitutes plagiarism
- Do the homework and take it seriously
- Start assignments early
- Come to office hours
- Work on any suggested practice problems
- Contact me *right away* if a problem arises
- Get things wrong, struggle, work hard

What the course assessments look like at a glance (more details on the next page):

- 3-5 WeBWorK assignments per week, usually due Tuesdays and Thursdays at 11:59 pm
- Weekly 10-minute homework quizzes (usually on Fridays at beginning of class)
- 3 labs exploring calculus applications
- 3 "chapter" exams (see schedule) and a comprehensive final

Final Exam: Friday December 7 from 8:00-10:00 am. All students must take the final exam at the scheduled time and date.

Important policies:

- No late work is accepted without *prior arrangements* made with me due to extenuating circumstances.
- Don't cheat, and don't plagiarize. Respect the CWU Student Conduct Code (http://app.leg.wa.gov/WAC/default.aspx?cite=106-125)
- I follow CWU's policies and recommendations for academic misconduct.

COURSE ASSESSMENT DETAILS

Labs and Lab write-ups:

- On most Wednesdays we will work in small groups on labs, which are sets of challenging problems that develop the central concepts in the course. These labs serve several crucial purposes:
  (1) They provide an opportunity to explore real world problems via multiple representations (verbal, graphical, tabular, symbolic). As you investigate these scenarios, you should be able to notice some strengths and weaknesses of each representation within the context.
  (2) They allow you to carefully communicate the process underlying your mathematical reasoning, both during class collaborations and on an individual level during the write-up stage.
  (3) They highlight the role of estimation and approximation in important calculus applications/scenarios

- There will be three (3) labs in total, one for each major unit/chapter in the course. Each lab will consist of two portions. The first portion will align with a "launch/exploration" day early in the unit/chapter serving to motivate a central topic from that chapter. Later in the unit, a second portion of the lab will align with a "summary" day which you will use to synthesize and articulate major findings related to the topic at hand. While attendance and participation are always important in my class, they are especially crucial on these lab days!

- Although you will work in groups during class on lab days, you will be required to submit individual lab write-ups of these class activities. Each of the three final write-ups will be due on the day of the corresponding unit/chapter exam (see course schedule on Canvas). More details about the labs and lab write-ups will be provided in a separate document posted on Canvas. Out of fairness to the other students in the class, **I will not accept late submissions** of lab write-ups; make sure you bring them to class on the appropriate due date.

Online homework:

So that you can practice the primary skills in the course, we'll use the online system WeBWorK (http://webwork.math.cwu.edu/webwork2/Math172Hancock) to submit and assess homework. There are several benefits to using this online homework system, including:

- You will obtain immediate feedback on your submitted answers, as opposed to waiting days after submitting a traditional pencil-and-paper assignment
- You will be granted multiple opportunities on each problem to correct various mathematical errors you might make before the submission deadline. On problems with multiple parts, you can get partial credit if you only get part of a problem right.

There will be multiple (usually three to four) WeBWorK sets assigned each week, usually due on Tuesday and Thursday nights at 11:59 pm. These problems are mostly computerized versions of problems from the book. I might choose to post additional chapter review problems at the end of each unit; such review problems will not count towards the homework portion of the grade, but are highly recommended.

Homework Quizzes:

Once per week, there will be a short 10-minute quiz at the beginning of class. These quizzes will very closely resemble select problems from the WeBWorK assignments you have already submitted on Tuesday and Thursday of that week. These "homework quizzes" will take place on **Fridays at the very beginning of class**, unless I announce otherwise in advance. The purpose of these quizzes is to allow you to:

- practice calculus skills from the homework in a low-stakes, in-class "testing" environment
- demonstrate your problem-solving *process* so I can give you feedback on more than your final answer

A list of homework policies and important advice can be found on Canvas. Please read this list carefully and let me know if you have any questions.

Chapter Tests and Final Exam:

We will have three chapter tests in this class, roughly corresponding to the material from chapters 2, 3, and 4 (respectively) from the textbook as well as topics from the labs we engage with. Tentative exam dates are provided in the course schedule on Canvas. We will also have a cumulative final exam covering all the material from this course. You should bring your own graphing calculator to each exam, and please note that *you will not be allowed to use your cell phone as a calculator* during exams.

****Important Note about Exams and Quizzes**

Please note that <u>there will be no makeup exams or quizzes</u>. Exceptions will only be granted if you miss an exam due to a *verifiable and documented* medical emergency or other university-authorized absence (eg. official CWU sports team obligation, participation in religious observance etc.) and have given me *appropriate advance notice*. Please consult the University student handbook for details on what is considered to be a University-authorized absence, and provide me with a written request ASAP (i.e. before the drop deadline) if you think you will have a conflict with any test dates.

COURSE GRADE CALCULATION

Weight	Assessment category (grading scale)
15%	Labs
20%	WeBWorK sets and HW Quizzes
45%	Chapter Tests (3)
15%	Final Exam
5%	Attendance and Participation

Letter grades will be assigned as follows:

A- 90.0 - 92.9%	A 93.0 - 100%	
B- 80.0 - 82.9%	B 83.0 - 86.9%	B+ 87.0-89.9 %
C- 70.0 - 72.9%	C 73.0 – 76.9%	C+ 77.0 - 79.9%
D 60.0 - 69.9%		
F 0 - 59.9%		

Key skills and learning objectives:
This list of key skills is a comprehensive breakdown of the learning objectives for Calculus I. The skills are grouped into "Big Ideas" that correspond roughly to the chapters in the textbook.

Functions and pre-calculus (Chapter 1)

F1 Coordinate changes in the independent variable with changes in the dependent variable to obtain the average rate of change ($\Delta y/\Delta x$).
F2 Express a function using a symbolic formula, a table of inputs and outputs, a graph, or a verbal description. Proficiently switch between these function representations.
F3 Use appropriate algebraic techniques and terminology to solve problems.

Limits and continuity (Chapter 2)

LC1 Explain the meaning of a limit.
LC2 Evaluate limits graphically, numerically, or symbolically (using algebra), including one-sided limits and limits at infinity.
LC3 Use the formal definition of continuity to determine if given functions are continuous.
LC4 Identify limits in indeterminate form and apply L'Hopital's rule correctly.

The meaning of the derivative (Chapter 3)

DM1 Reproduce the limit definition of the derivative, and explain the meaning of each symbol.
DM2 Explain the connection between average and instantaneous rates of change. Interpret them using secant and tangent lines and limits.
DM3 Calculate estimates of the derivative using the difference quotient.
DM4 Given a graph of a function, estimate specific values of the derivative, and produce a sketch of the derivative function.

DM5 Recognize points where a function is or is not differentiable. Use the definition of the derivative to support your reasoning.
DM6 Use derivative notation correctly.
DM7 Correctly interpret the meaning of the derivative in context. Assign the correct units to the value of the derivative.

Calculating derivatives with "shortcut" rules (Chapter 3)
DS1 Find the derivative of polynomial, exponential, logarithmic, and trigonometric functions.
DS2 Use the product, chain, and quotient rules to differentiate more complicated functions.
DS3 Compute derivatives correctly using multiple derivative rules in combination.

Using derivatives (Chapter 3/4)
DU1 Recognize and explain the relationships among the behaviors of f, f' *and* f'', including slopes, rates of change, and concavity.
DU2 Use the information provided by f, f', and/or f'' to identify and draw accurate graphs of the other functions.
DU3 Find the equation for the tangent line to a function at a given point.
DU4 Use tangent lines to approximate function values.
DU5 Find relative and absolute extrema and points of inflection of functions.
DU6 Set up and solve applied optimization problems.
DU7 Set up and solve applied related rates problems.

***Tentative* schedule**: A tentative course schedule will be posted on Canvas. This schedule is subject to revision as the quarter progresses, but I anticipate we will mostly adhere to it.

Accommodations for students with disabilities:
Students who need accommodation of their disabilities should contact me privately to discuss specific accommodations for which they have received authorization. If you need accommodation due to a disability, please register with Disability Support Services in Hogue 126. They may also be reached via email at (DS@cwu.edu).

Respect, inclusivity, and diversity:
In my classroom, diversity and individual differences are respected, appreciated, and recognized as a source of strength. Students in this class are encouraged and expected to speak up and participate during class meetings, **and** to carefully and respectfully listen to each other. So that everyone feels comfortable participating, every member of this class **must** show respect for every other member of this class. Be good to each other.

Cell phone policy:
I will not allow cell phones or similar devices to be used during exams. This includes using your phone as a calculator. During exams, please keep all phones out of sight and silent. If I see anyone using a cell phone during an exam, I may assign that student a zero on that exam.

Changes to the syllabus:
I reserve the right to make modifications to this syllabus at any time. In the event of such changes, I will notify the class and upload a revised syllabus on Canvas.