Berkeley City College Spring 2015
Mathematics 3A Calculus I Code: 21942, 5 units
Syllabus v1.0

Instructor: Shawn McDougal **E-mail:** smcdougal@peralta.edu
Office Hours: MW 1:30-2:30pm, TTh 2-3pm (plus 1 hr by appointment)
Office Location: Room 353 **Phone:** (510) 981-5018

Class Meeting Days/Times: Tuesday and Thursday, 10am-12:15pm **Location:** Room 51

Prerequisites: Math 2, or Math 1 + Math 50, or placement through assessment

Textbook: *Single Variable Calculus: Early Transcendentals by James Stewart. 7th edition*
The textbook is available for purchase in the bookstore (Room 517). The text is also on reserve in the BCC library (Room 131).

Materials: You should obtain a scientific calculator. Access to a graphing utility for some of homework problems is encouraged but not required.

Catalog Description
Theorems on limits and continuous functions, derivatives, differentials, and applications: Fundamental theorems of calculus and applications; properties of exponential, logarithmic, and inverse trigonometric functions, and hyperbolic functions.

Class format
Our typical class will be a mix of lectures clarifying and expanding upon the points raised in the book and the videos, hands-on problem solving sessions, solution presentations (from students as well as me), and open discussion. About half the class will be "workshop"—you will be working on problems individually or in groups as I go around helping as needed. In addition to providing feedback and guidance, I will often ask you to talk through the problems or ideas with other students. Talking through your ideas with others is a good way to 1) test and refine your ideas, 2) learn multiple ways of thinking about a concept or solving a problem, and 3) practice putting the ideas in your own words.

Every day your main homework is to *prepare for class*: you should come to class having already read the section(s) to be covered in class that day, as well as having watched any designated videos. (Before most classes there will be around 3 short—5 to 10 min.—videos for you to watch.) You should take notes on the examples you see in the videos, get a basic idea of the key concepts and theorems in the book, and know where to find things. You are *not* expected to understand everything you read or see the very first time—that is the point of coming to class and doing the follow-up exercises!—but you will be get the most out of class—and you will not be lost—if you come prepared. In class I will give a list suggested "homework" problems to guide your follow-up study, but I will not collect or grade them.

Self-intros
Every day for the first few weeks of the course, 3-4 students will get a chance to briefly introduce themselves to the class. "Briefly" meaning 30 sec. to 1 min. This will allow all of us to get to know a bit about each other. Include an answer to one of the following "questions":

- One experience you had after age 13 that really shaped who you are or how you think.
- Something a lot of people who meet you wouldn't guess about you.
- If you could, what is one thing you would change about society?

Grading Allotment

	points each	total points	total percent
Quiz (5)	28	140	35%
Final Exam	100	100	25%
Daily Preps (20)	4	80	20%
Solution Shares (2)	10	20	5%
Moodle Check-ins (20)	1	20	5%
Connections (5)	4	20	5%
Projects	20	20	5%

Grading Scale A: 90% - 100 %, B: 75% - 89%, C: 65% - 74%, D: 55% - 64%. F: Below 55%

Daily Preps
In almost every class there will a *Daily Prep*—a brief (< 5 min.), open notes (and usually open book) "quiz". I use quotes because anyone who comes prepared to class—i.e. watches the assigned videos, does the reading, and takes notes on the key points—will easily get full credit. Each *Daily Prep* is worth 4 points (i.e. 1% of the grade). There are no make-ups. To account for the fact that life happens and sometimes folk can't come to class prepared, there are many free passes: out of about 28 *Daily Preps* I will count only your best 20.

Solution Shares
I want to foster an environment where students learn from each other. I also want to help students improve their presentation skills. On two occasions, you will prepare and present for the class a solution to a problem selected from the suggested HW. Each *Solution Share* is worth 10 points (i.e. 2.5% of the course total). You will choose which problem to present in advance, from a list of options I provide. I the presentations will typically last 3-5 min., with another 3-5 min. for questions. Grading will be based on clarity, correctness, and appropriate terminology. (A rubric will be provided.)

Quizzes
There will be a quiz every two weeks, every other Thursday starting in Week 2. There will be 7 quizzes altogether. Each quiz is worth 7% (i.e. 28 points). There are no make-ups. There will be 2 free passes: I will drop your lowest 2 quiz scores, so only your best 5 quizzes will be counted. The quizzes will be mostly—if not totally—based on the suggested HW problems.

Final Exam
The Final Exam is scheduled for Tuesday, 5/19 in class. It will cover all the material of the course. Many of the problems will be taken from the quizzes. The Final is worth 25% of the course total.

Moodle Check-ins
For every class from Week 2 until Week 15 you are asked to write a Moodle *Check-in*. The purpose of the *Check-ins* is to 1) encourage folk to discuss the material outside of class, 2) let me know which concepts I most need to clarify in class, and 3) build community among students.

The Moodle Check-in can be any of the following:

- a *good question* about a problem or concept or example in the book or in a video
    - good question: "On problem X in section Y I tried to find the slope using the formula m = change in x/change in y but got the wrong answer. What am I missing?"

    - not-so-good question: "I just don't get problem X."
- an *interesting comment* about a problem or concept or example in the book or in a video
    - interesting comment: "I wonder how people decide when to fit a line and when to fit a polynomial to a given set of data."
    - not-so-interesting comment: "Curve fitting is cool!"
- a *substantive response* to someone else's question or comment.
    - substantive response: "Seems there should be some sort of convention or standard around how much error there is when you try to fit a line."
    - not-so-substantive response: "Me too!"

The *Check-ins* are to be posted in the appropriate weekly forum on our Moodle site. Each *Check-in* is worth 1 point. There will be 28 class meetings from W2 to W15, so you get 8 free passes: you only need to do 20 *Check-ins* to get full credit (20 points = 5%) for this part of the course.

Weekly Schedule

Week of Tuesday...	Sections	quizzes (Thursdays) / other notes
1/20	1.1-1.3, Appendix D	
1/27	1.5-2.1	Quiz 1
2/3	2.2-3	
2/10	2.4-6	Quiz 2
2/17	2.7-8	
2/24	3.1-2	Quiz 3
3/3	3.3-5	Form Project Teams (cf. Projects handout)
3/10	3.6-9	Quiz 4
3/17	3.10-4.1	
3/24	4.2-4.3	Quiz 5
Spring Break		
4/7	4.4-5	
4/14	4.7-9	Quiz 6
4/21	5.1-3	
4/28	5.3-4	Quiz 7
5/5	5.5-6.1	
5/12		Present Projects + Review for Final
Final Exam 5/19		

Important Dates (cf. BCC Spring 2015 Academic Calendar)
Feb. 1 – Last day to add regular session classes.
Feb. 1 – Last day to drop regular session classes and receive a refund.
Feb. 6 – Last day to file for P/NP grading option for regular session classes.
Apr. 25 – Attendance Verification Day. Last day to drop with "W".

Connections Assignments

Connections is an opportunity for students to connect with diverse colleagues outside of class while reflecting on issues relating to math, personal interest, or community interest.

There will be 5 *Connections* assignments, spaced a week apart. The first is due Thursday 1/29 (during Week 2, aka "W2"). The others are due on successive Thursdays. Each should take 15-30 minutes to complete.

- Each week (from W2 to W6) students will form teams of 2 or 3 people.
- Each team will submit a roughly 2-3 paragraph write-up.
- Either hardcopy or electronic submission (pdf, rtf, or plaintext format) via Moodle "dropbox" is fine. They are due at the beginning of class. (See *Connections Form* for the required info.)
- Each *Connections* assignment is worth 4 points (i.e. 1%).
- In order to get credit for N assignments, each student must team up with at least N different people. (So I suggest you don't team up with the same people every week ;^)
- On each team, there are 2 roles: Initiator and Responder. Students choose who plays what role.
    - The Initiator makes the initial remarks to get the conversation started. The Responder (or Responders) responds to or follows up on the comment.

<u>Menu of options</u>

1. a recent experience that has really impacted you
2. something you're confused, curious, or excited about in class
3. news story with (interesting, confusing, problematic) use of math
4. example of how (lack of) math knowledge is used to trick people
5. an issue in the school or community that really bothers you and/or an idea for improving things in the school or in the community
6. interview a "community expert" on how math impacts their work or the way they think ("community expert" meaning someone who works at BCC or in the local community)
7. attend and comment on a school or community event related to math, science, or social justice

Connections Form (template)

Initiator Name:
Responder Name(s):
Date:
Topic: (or Name and Job of Community Expert or Name of Community Event)

Write up:...

Projects

Beginning in Week 7, students will form teams and choose topics to do mini-research projects on. In the last week of class, teams will present their results in a "gallery walk", attended by their peers and by some special guest judges. The Projects will be worth 5% of the course total. (I use the prefix "mini" above because the expected time spent doing the research is only about 2-3 hours.)

The purpose of the Projects is 1) for you to learn excellent examples of how mathematical thinking applies to real world issues outside the classroom, 2) help you gain valuable skills in interpreting, visualizing, and presenting data, and 3) help break down the barriers between knowledge "in the classroom" and knowledge "in the community".

Project themes (Note: These are only suggestions/examples; others may be chosen)

1. income distribution (e.g. over time, CEO pay, by career, gender, race, education level)
2. wealth distribution (e.g. current, by country, over time)
3. education by race and/or gender
4. student success rates
5. education costs over time
6. geologic time scales
7. stars and/or galaxies
8. astronomical distances
9. probability of earth-like planets
10. sizes of natural objects: micro to macro
11. light frequencies—infrared to ultraviolet and beyond
12. life expectancy (by country, income, race, over time)
13. mortality and/or injury rates by profession
14. incarceration rates (over time, by country, by race)
15. crime rates (over time, by state)
16. energy usage/carbon footprint (e.g. by sector, by country)
17. cells in the body (e.g. human vs. bacteria)
18. the brain: neurons and synapses
19. housing costs vs. income over time
20. medical costs (over time, by country)
21. public transit (usage, costs)
22. marriage/divorce rates over time

Project timeline

1. form teams of 2-4. choose theme in Week 7 ("W7")
2. formulate research question W8
3. research W9-10
4. create brief survey to engage public around issue W11
5. conduct survey with 5-10 people W12-13
6. write up results W14-15
7. present results—mini-talk or poster in gallery walk W16

A more detailed timeline and guidelines for the Project will be provided later.

Attendance
Students who miss more than 2 consecutive classes without contacting me to explain their absences may be dropped from the course. Anyone who misses the first 2 class meetings may be dropped. Still, do not assume that I will automatically drop you if you merely stop attending class. Anyone whose name appears on the final grade roster who has not been attending class will receive an F.

Academic Honesty
Any evidence of cheating on an exam or quiz will result in a score of zero (0), and may incur further penalties. Cheating includes but is not limited to bringing notes or written or electronic materials into an exam or quiz, copying off of another person's exam or quiz, allowing someone to copy off of your exam or quiz, and having someone take an exam or quiz for you.

General Information/Expectations
To be successful in this course, students should typically spend about 15 hours per week outside of class studying the material and completing assignments. Some may need more or less time do well. Please determine what type of math learner you are and study accordingly.

Please turn off your cell phone ringers/alarms during class.

Make sure your preferred email address is listed on Passport and Moodle. For Moodle see http://eperalta.org/spring2015/

I usually don't answer questions about the course material over email. (Reason #1: I don't want to be swamped with emails. Reason #2: It's easier to answer a question once rather than 5 or 10 times.) To help you get your questions answered quickly by other students and/or me, and to help students share ideas and build community with each other, I have set up a Moodle site for our class. Also, on Moodle you will be able to review your grades throughout the semester.

Student Learning Outcomes
1. Find limits and use limits and limit laws to determine whether a function is continuous, to find the derivative of a function and to evaluate a definite integral of a function.
2. Find derivatives of polynomial, rational, exponential, logarithmic, trigonometric, and hyperbolic functions and sums, differences, products, quotients, powers, and compositions thereof. 3. Solve application problems including minimization, maximization and rate of change problems; use limits and derivatives to analyze and graph functions.
4. Solve basic integration problems; calculate definite integrals, the area under or between curves; apply the Fundamental Theorem of Calculus to solve real world problems.

Justification for Course
Satisfies the General Education and Analytical Thinking requirement for Associate Degrees. Provides foundation for more advanced study in mathematics and related fields. Satisfies the Quantitative Reasoning component required for transfer to UC, CSUC, and some independent four-year institutions. Acceptable for credit: CSU, UC. AA/AS area 4b, CSU area B4, IGETC area 2A.