Title: Calculus from a Teaching and Problem Solving Perspective


Classroom: JB 387
Meeting time: 4:30 PM–7:20 PM
Instructor: Dr. Corey Dunn
Dr. Dunn’s Office: JB 322
Dr. Dunn’s E-mail: cmdunn “at” csusb.edu
Dr. Dunn’s Phone: (909) 537-5368
Important Dates: 4/27, 5/28: State Budget Closure Days
5/31 Memorial Day
Furlough Days: Yet to be finalized, these will be announced in class.
Office Hours: TR, 2:30–4:30, or by appointment.

Course Website:
http://www.math.csusb.edu/faculty/dunn/634-102/634-102.html

General Information

1. Information on Grading: The grades will be given as follows: the A range will be between 90% and 100%, the B range will be between 80% to 90%, the C range between 70% to 80%, etc. A + or - will be added to grades as appropriate (for example, 90% to 92% may be given an A-, grades between 78% and 80% may be given a C+, although this is up to my discretion.) The grade will be computed as a percentage of what points you earn divided by the total possible 1000 points. These point breakdowns are listed below, and subsequently described:
3 Presentations \( \times 3 \times 100 \) points each
3 Reflection papers \( \times 3 \times 100 \) points each
Final presentation 150 points
Final Paper 150 points
Participation + Attendance 100 points
Total: 1000 points

(a) **The structure of the course.** There are three main components of single variable calculus: limits and differentiation, the theory of integration, and sequences and series. As such, the course will be divided into 3 main parts corresponding to these main ideas, each part lasting about 3 weeks. For each part, you will be required to provide one in-class presentation about a particular aspect of the content covered, and to write a not-too-long but not-too-short reflection paper on the experience. After we cover these three main parts, you will research your own topic in calculus, and your “final presentation” will cover this additional topic in addition to anything relevant to it. Finally, your “final paper” will be a cumulative reflection paper, citing all of your work throughout the term. It will become clear what all belongs in this paper as the course unfolds, and you will be given specific guidelines to follow. Be sure to read the deeply relevant information below, in addition to the ground rules that follow.

(b) **Information about your 3 presentations.** Each of your three presentations should be limited to the content most recently discussed in class, and would be roughly 20-25 minutes, although this varies depending on your topic. For example, your second presentation would be mainly about integration, not mainly about the progression from differentiation to integration (although it is entirely appropriate, in some cases, to include a discussion of an aspect of differentiation to make your point). There should be three main components: a theoretical discussion (that is, be sure to discuss the theory that you will use, independently of any example), an application of the theory, and an example applying what you’ve discussed. *Mostly everything else is up to you.* The class will be your “students” (including myself), and you may present the information the best way you see fit. This could include lecture, groupwork, or even a quiz to test understanding! (please see the ground rules below.) What will follow will be a structured assessment of your presentation, which will include appropriate amounts of positive and negative criticism.

(c) **Information about your 3 reflection papers.** Each of your reflection papers will be due on the second class period after you finish a
presentation. In your paper, you must summarize the course material we covered as a class in that segment, you must summarize the specific material you learned about for your own presentation, and discuss generally how you think it went. *Your reflection paper is not graded up or down for the success or failure of your presentation.* Discuss your teaching methods, and assess them insofar as how well you think the class understood what you were talking about. Include and discuss the constructive comments that followed your presentation. Discuss anything you might change for next time and what new ideas you’ve learned. The paper will be graded on completeness, depth of thought, and *especially grammar and presentational skill.* That’s right: There is no place for sloppy grammar, even if you teach math.

(d) **Information about your final presentation.** Your final presentation is a discussion of your own topic that exists outside and beyond these three cornerstones of calculus. This could include differential equations, multivariable calculus (limited to information found in the prerequisite course Math 251), arc length and the differential geometry of curves and/or surfaces, further applications of differentiation or integration, or any more real world application not yet discussed that involves any form of calculus. This presentation might end up being a little longer than the others, perhaps 30 minutes. Again, discussion will ensue following your presentation.

(e) **Information about your final paper.** Your final paper will be the culminating centerpiece to the course. It will include a (brief and factual) summary of all that we’ve done contentwise. In addition, it will include a summary of your three presentations, your final presentations, and how you have integrated and assimilated the criticism you’ve been given throughout the course. It should also include a contrast in your perspective on teaching this sort of material at the start of the course compared to teaching this material at the end of the course, from the perspective of both a teacher and a student. Submissions of this paper will be valid anytime after your last presentation and subsequent class assessment/discussion, but will not be (and can not be) accepted anytime after 4:30 PM, Tuesday June 15th.

(f) **Deeply relevant information.** In this course I have set down specific guidelines for success, and as such, if you follow the guidelines to the letter, you should do just fine. But this course is about more than that: it’s an opportunity to explore the learning and subsequent teaching of calculus in a risk-free environment. It is unlikely that you should have such an environment in the future, and so you can expect to get out of
this course what you put into it. I would say that it is not the case that if you work twice as hard, you’ll learn twice as much. I’d say that if you work twice as hard, you’ll learn at least four times as much. Use this course as an opportunity to push yourself, and I think you will thank yourself for the rest of your life that you did.

(g) **Ground rules.** There will be lots of discussion in this class that will sometimes assess someone’s work or ideas. This sort of collaborative learning is an essential part of growing as a teacher and learner of any subject. *The only real rule in this course is that at all times we remain respectful.* This means that criticism (negative criticism, in particular) is respectfully given in a positive spirit, and it is positively received in the same spirit.

(h) **A general calendar of the class content.** Keep in mind that the flexible nature of this course could either mildly slow or accelerate this schedule. Additionally, the approval of my furlough dates could effect this schedule as well. Generally, we will be following this schedule:

<table>
<thead>
<tr>
<th>Date Range</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 6 – April 22</td>
<td>Part I: Limits and Differentiation</td>
</tr>
<tr>
<td>April 29 – May 11</td>
<td>Part II: The theory of integration</td>
</tr>
<tr>
<td>May 13 – May 27</td>
<td>Part III: Sequences and Series</td>
</tr>
<tr>
<td>May 27 – June 10</td>
<td>Preparation and delivery of final presentations</td>
</tr>
</tbody>
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2. **General information regarding the class:**

   (a) Prerequisites: Math 213, 251, 631, 632, 633, and admission to the MAT in Mathematics.

   (b) Course Content: We will cover differentiation, integration and sequences and series from a teaching and problem solving standpoint.

   (c) Cell phone policy: the classroom is not a place for texting or calling, ever. It’s embarrassing to you, and disruptive to the class. In addition, it is overwhelmingly offensive. If you must interrupt class to send a message, excuse yourself quietly to do so.

   (d) If you are in need of an accommodation for a disability in order to participate in this class, please contact Services to Students with Disabilities at UH-183, (909)537-5238.

   (e) Information regarding furloughs. On the dates listed above I will be forced to take an unpaid day of vacation, and I am contractually forced to both not work that day and not exceed a certain amount of work in a certain amount of time. This means that I will NOT be working on those days listed above (no office hours, no grading, not answering
emails—nothing), and class is cancelled on any of those days which fall on a class day—that may sound like fun, but what it means is that you are being asked to learn 100% of this class with only 90% of the class periods, and I will do what I can to make up the difference, but I can’t overwork myself to make that happen... in fact, I’m being forced not to overwork to help you. I will discuss the general impact of these furloughs in class, but you should know that the state’s representatives and the Cal State Chancellor’s office made this decision (although it was voted upon by a large body of people). If you are outraged that your education does not appear to be important to your state representatives and by the Chancellor’s office (as I am), I encourage you to contact those offices and voice your opinion.