MTH173 (3 units)
Business Calculus

Sec 1 MWF 1:30-2:25 pm Evans 122

Instructor:	John Cochrane
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Office Hours:	MWF 2:30-3:30

Text Books: Calculus and its applications, 11th Edition

University Mission:
Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission:
The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

GENERAL EDUCATION
This course is one of the components of the General Education Program at Point Loma Nazarene University, in support of the general education learning outcome: *Quantitative Reasoning: Students will be able to solve problems that are quantitative in nature*. The purpose of general education is to provide a common educational experience, to develop essential skills, and to provide a broad cultural background for personal and professional growth.

Catalog Description:
MTH 173 (3 Units) Business Calculus
A calculus course intended for those studying business economics, or other related business majors. This course covers differential and integral calculus of elementary functions with an emphasis on business applications. This is a brief calculus course and not appropriate for students majoring in science, computer science or mathematics. Prerequisite(s): MTH113 or equivalent.

Learning Outcomes
GE Learning Outcomes:
- Students will be able to solve problems that are quantitative in nature.
- Students will be able to formulate a mathematical model from a verbal description of a problem.
- Students will be able it solve non-routine problems using logic and quantitative techniques.
- Students will be able to construct solutions to problems using computational techniques

Course Learning Outcomes:
- Students will be able to find the derivatives of elementary functions.
- Students will be able to find the anti-derivatives (integrals) of elementary functions.
- Students will be able to apply differentiation and integration to solve business problems.

Course Format
Mathematics is learned by doing. This course is designed to help you learn calculus and quantitative reasoning. You are encouraged to work with each other, however, you are responsible for the material and simply copying answers will be to your detriment.

TOPICS TO BE COVERED

- Differentiation of elementary functions.
- Integration of elementary functions.
- Marginal analysis.
- Optimization.
- Price, demand and revenue.
- Elasticity of demand.
- Consumer and producer surplus.
- Revenue, cost, and profit.

Homework:
Homework will be assigned most days in class and will always be due the next class period. A complete list of problems is at the end of this document. No late work will be accepted; however the lowest two homework scores will be dropped when computing your final grades.

Examinations and the Final Examination:
There will be two Mid-Semester Examinations and a comprehensive Final Examination on **Monday April 30 1:30-4:00 PM**. Both Mid-Semester Examinations and the Final Examination will include problems and questions over material assigned in the text, readings and handouts, as well as material presented in class. The examination schedule is included in the daily schedule. The instructor will not accept excuses such as poor communication with parents, benefactors, surf team sponsors and/or travel agents. No examination shall be missed without a well-documented emergency beyond your control. A missed examination without the proper documentation will receive a zero.

Grade Components:

Grade Component	Percent
Two Examinations at 25% each	50
Final Exam	30
Written Homework	20
Total	100

Grading Scale:
Final grades will be computed using the weighting above. Approximate minimal percentages required to obtain a given grade are:

Grading Scale in percentages	A	B	C	D
+		(87.5, 90.0)	(77.5, 80.0)	(67.5, 70.0)
	[92.5, 100]	[82.5, 87.5]	[72.5, 77.5]	[62.5, 67.5]
-	[90.0, 92.5)	[80.0, 82.5)	[70.0, 72.5)	[60.0, 62.5)

Attendance:
Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See Attendance Policy in the in the Undergraduate Academic Catalog.

Class Enrollment:
It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

Academic Accommodations:
If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information. For more details see the PLNU catalog under Academic Accommodations. Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

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Academic Honesty:
Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See the catalog for definitions of kinds of academic dishonesty and for further policy information.

Copyright Protected Materials:
Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

Credit Hour:
In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 3-unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

Final Exam:
1:30-4:00 PM on Monday April 30, 2018

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

The Final Exam is a Comprehensive Examination.

Daily Schedule

Monday	Wednesday	Friday
1/9/2018 (Tues.) Rev. of Precalc. R.1, R.2	1/10/2018 Review of Precalculus R.3, R.4	1/12/2018 Review of Precalculus R.5, R.6
1/15/2018 **MLK Day (No Classes)**	1/17/2018 1.1 Limits: numerically and graphically	1/19/2018 1.2 Algebraic limits and continuity
1/22/2018 1.3 Average rates of change	1/24/2018 1.4 Differentiation using limits	1/26/2018 1.5 The power, sum-difference rules
1/29/2018 1.6 The product and quotient rules	1/31/2018 1.7 The chain rule	2/2/2018 1.7 The chain rule
2/5/2018 2.1 First derivative: max and min	2/7/2018 2.1 First derivative: max and min	2/9/2018 2.2 Second derivative: max and min
2/12/2018 2.2 Second derivative: max and min	2/14/2018 2.4 Derivatives: absolute max and min	2/16/2018 2.5 Applications of Max/Min
2/19/2018 2.6 Marginals	2/21/2018 **Review for Exam 1**	2/23/2018 **Exam 1**
2/26/2018 2.7 Differentials	2/28/2018 2.8 Implicit Differentiation	3/2/2018 Extra Practice
3/5/2018 **Spring Break**	3/7/2018 **Spring Break**	3/9/2018 **Spring Break**
3/12/2018 3.1 Exponential Functions	3/14/2018 3.2 Logarithmic Functions	3/16/2018 3.5 Annuities
3/19/2018 3.6 Amortization	3/21/2018 4.1 Antidifferentiation	3/23/2018 4.2 Antiderivatives as areas
3/26/2018 4.3 Area and definite integrals	3/28/2018 4.4 Properties of definite integrals	3/30/2018 4.4 **Easter Break**
4/2/2018 4.5 **Easter Break**	4/4/2018 **Review for Exam 2**	4/6/2018 **Exam 2**
4/9/2018 4.5 Integration by substitution	4/11/2018 4.5 Integration by substitution	4/13/2018 4.5 Integration by substitution
4/16/2018 4.6 Integration by parts	4/18/2018 4.6 Integration by parts	4/20/2018 5.1 Consumer-producer surplus
4/23/2018 5.1, 5.2 Consumer-producer surplus	4/25/2018 5.2 Integration growth and decay models	4/27/2018 5.2 Finish section + Review for Final Exam
4/30/2018 **Final 1:30-4:00 PM**	5/2/2018	5/4/2018

Homework List

Section	Homework
R.1	11, 15, 16, 33, 35, 36
R.2	23, 43, 59, 72
R.3	3, 4, 5, 11, 22, 27, 33, 36, 45, 57
R.4	4,15, 21, 41, 43, 62, 67
R.5	11, 13, 25, 30, 33, 45, 61, 83, 87, 91, 95
1.1	15, 18, 25, 26, 33, 34, 45, 63, 64
1.2	1-8, 10, 13, 17, 18, 20, 21, 31, 32, 38, 39, 47, 53
1.3	3, 15, 18, 19, 23, 24, 25, 26, 27, 29, 30, 31, 32, 37, 38
1.4	1, 3, 10, 15, 20, 25, 26, 49
1.5	13, 20, 27, 30, 35, 45, 46, 53, 54, 59, 73, 94, 99, 100
1.6	9, 10, 37, 40, 49, 53, 56, 59, 61
1.7	7, 8, 9, 25, 37, 61, 65, 66, 71, 72, 73, 75, 76
2.1	4, 5, 11, 12, 17, 29, 71, 72, 79, 80, 85, 86, 87, 93, 96
2.2	6, 7, 12, 13, 17, 48, 49, 54, 55, 63, 64
2.4	4, 5, 19, 20, 52, 53, 57, 62, 97, 102, 103, 104, 117
2.5	29, 30, 32, 33, 34, 39, 42, 43, 45, 47
2.6	4, 5, 6, 17, 18, 19
2.7	4, 5, 6, 7, 11, 12, 13, 14
2.8	8, 9, 12, 19, 22, 26, 27, 29, 34, 35, 37
3.1	4, 5, 29, 30, 31, 34, 44, 45, 53, 58, 59, 81, 84, 85, 86, 87, 89
3.2	3,4,9,12,25,28,49,52,55,57,58,61,63,67,71,77,91,95
3.5	3, 4, 7, 9, 11, 12, 13, 14, 23, 24, 29, 30
3.6	TBD
4.1	5, 6, 11, 12, 15, 16, 28, 35, 39, 40, 51, 56, 57, 59, 60, 62, 63, 65, 66
4.2	1, 4, 13, 14, 17, 18, 22, 23, 25
4.3	5, 6, 8, 9, 11, 12, 15, 16, 19, 22, 33, 34, 35, 36, 47, 49, 50, 59, 62, 63
4.4	1, 4, 5, 8, 10, 11, 13, 14, 45, 46, 47,
4.5	1, 2, 7, 9, 15, 29, 31, 32, 40, 43, 46, 59, 87, 88
4.6	6, 7, 9, 11, 13, 16, 26, 27, 31, 33, 35, 38, 39, 40
5.1	3, 10, 11, 15, 16
5.2	TBD

INSTRUCTOR PROFILE

I was born in Coldwater, Michigan and received my high school diploma from Coldwater High School. I attended Michigan Technological University for one year and then received an appointment to the United States Naval Academy from which I graduated with a Bachelor of Science Degree in Theoretical Mathematics. I then attended the United States Naval Postgraduate School and earned a Master of Science Degree in Applied Mathematics.

Following graduation from the Naval Postgraduate School, I spent 22 years as a naval officer. While on active duty, I served aboard seven ships, one of which, a destroyer, I commanded. Also while on active duty, I served a tour of duty as Associate Chairman of the Mathematics Department at the United States Naval Academy, during which I taught Calculus I, II, and III, Differential Equations, Leadership, and Tactics. I was also the Faculty Advisor to a Midshipman who was a Trident Scholar. In addition, while serving as Executive Officer in a destroyer, I was a part–time teacher in the Navy High School Studies Program.

Since retiring from the Navy, I have been an operations manager and program manager for a defense contractor and have held various sales and sales management positions in the financial services industry. Recently (2005- present), on a part-time basis, I have taught Algebra, Statistics, Trigonometry, Calculus, Physics, and Differential Equations at Grossmont Community College and for Vincennes University. I also been an online instructor of Algebra at Ashford University. In addition, I have taught or currently teach AP Statistics, AP Calculus, Geometry, Pre-Algebra, and Biology at the Children's Creative and Performing Arts Academy in San Diego, CA.

In my view, a good education goes well beyond providing students with the knowledge and skills needed to make a living. It should also help them understand and appreciate the world around them, and to view learning as a lifelong pursuit. More importantly, I believe that each of us was created in the image and likeness of God to fulfill His purpose for our lives. I believe it is the job of my students to discover and fulfill their purpose in life. My job is to do whatever I can to assist them in navigating through that voyage of discovery.

My wife and I have two daughters who are now adults and two children who are adopted: a daughter, age 27, and a son, age 19. We live in Alpine, CA, which is about 20 miles east of San Diego. My interests, other than mathematics and science, include fishing with my 19-year-old, gardening, history, poetry, elocution, and the Bible.

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