FRANKLIN
UNIVERSITY SWITZERLAND

MAT 200, Calculus
Department of International Management and Math, Fall 2018

I. COURSE INFORMATION

Instructor: Erich Prisner
eprisner@fus.edu
Office Hours:
M 12:00-13:00, 17:15-17:45
W 14:30-15:30,
Th 12:00-13:00,
and by appointment, LAC 11
Class location: LAC 6
Class Meeting times: MTh 13:00-14:15
Final: Thursday December 13, 11:00-13:00

II. COURSE DESCRIPTION

The course begins with a review of functions and their graphs, after which students are introduced to the concepts of differentiation and integration. Understanding is reinforced through extensive practical work, with a strong emphasis on applications.

Calculus deals with functions and change. Besides limits, the two main concepts are derivatives and integrals. All these concepts will be introduced thoroughly. We will treat the standard techniques (product rule, chain rule, implicit differentiation) of differentiation. Differentiation can be applied to solve optimization problems, whereas integration is used to compute areas. The Fundamental Theorem of Calculus, which connects both concepts of differentiation and integration, will also be covered. We apply these techniques to polynomials, rational functions, power functions, exponential and logarithmic functions, and combinations thereof. Many applications will be given.

III. COURSE GOALS

Calculus is important for two reasons: First, it is a very important part of our culture. It was one of the main success stories allowing science to develop into what it is today. Second, Calculus is needed in other subjects, Economics, Physics, other Natural Sciences, and Engineering, for instance.

Calculus satisfies the Math core requirement. It is also needed in the majors of Economics and Banking and Finance. Furthermore it counts, and is required for the Math minor.

The goal of the course is to provide students with a good understanding of the concepts of calculus, and also to give them the techniques at hand which they need in applications as in Management Science and Economics. Very important

for applications are the ability to formulate a "real world problem" in mathematical terms, to solve it, and to interpret the results.

IV. SPECIFIC LEARNING OUTCOMES

Upon completion of this class, students should
- have a clear understanding, intuitive but also formal, of the main concepts in Calculus and their importance.
- be familiar with the historical development of Calculus, and its role for other subjects.
- be able to use the techniques of Calculus to solve mathematical problems.
- be able to use the techniques of Calculus to solve real-world problems, with or without the use of technology.
- be able to communicate both concepts and methods verbally and in written form.

V. REQUIRED TEXTS AND MATERIALS

Calculus for Business, Economics, and the Social and Life Sciences by L.D. Hoffmann and G.L. Bradley, McGraw-Hill. There are also some Youtube videos available, and more material on MOODLE.

VI. ASSESSMENT OVERVIEW

At the end of the semester, you will receive a score from 0 to 100%, based on the following:
- Homework: 17%
- Homework Presentations: 3%
- Five best of six quizzes: 15%
- Warm-Ups: 5%
- Challenges, Reports, Reflections: 10% (up to 4% for a second one)
- Midterm exam: 20%
- Final exam: 30%

Nonattendance may lower your score as will be described below.

VII. ASSESSMENT DETAILS

Homework:

Homework will be assigned almost every week, and will be collected. I will only look at parts (approximately 30%). No late homework will be accepted. You are allowed (and encouraged) to work in groups and to discuss assignments, but everything submitted must be your own work: You must have done it either alone or in a group, and you must have understood it. You should be able to explain your solution to me or to the class. Each week I will ask some of you (who have submitted a good answer) to present your solution to the class. Homework is a very important part of the class: It will form the basis of much class discussion, and the questions in the tests and quizzes will usually be very close to homework exercises assigned. Usually the homework will be individualized—every student will get different questions to work on.

Challenges, Reports, Reflections:
Every week (except for the first two), in addition to homework assignments there is an assignment called either Challenge, Report, or Reflection. In any case a **typed** report of about one page length has to be submitted. Submitting a sequence of formulas is not enough, instead you should describe the problem and its solution in detail, including explanations, descriptions, formulas, calculations, graphs if needed. Any of these assignments can only be done by up to 3 students, and students have to sign up on each in advance. There will be strict deadlines for a draft and for the final version. Each student must do one of these reports. If you do a second one you will get the credit (up to 10%) for the better one, and up to 4% for the weaker one.

Warm-ups:
When you are supposed to read some material before class, usually you will be supposed to answer some questions about the reading material before class (through MOODLE). No exception for the deadline will be given for any reason, also submission has to be electronically!

Quizzes, Midterm, Final:
There will be about six 15-minutes quizzes. Only the best five of them count. There also will be a midterm exam and a final exam. No make-up quizzes or tests are given, unless there is documented evidence of a medical (or other serious) problem.

Attendance:
Regular attendance is required. Being late counts as half an absence. You can miss 4 classes without penalty, but I will subtract 5% from your score for each further missed class.

VIII. GRADING POLICIES AND EXPECTATIONS

Final grades will be determined as follows:

	A: 93 - 100 %	A-: 90 - 92.9 %
B+: 87 - 89.9 %	B: 83 - 86.9 %	B-: 80 - 82.9 %
C+: 77 - 79.9 %	C: 73 - 76.9 %	C-: 70 - 72.9 %
D+: 67 -69.9 %	D: 63 - 66.9 %	D-: 60 - 62.9 %
F: below 60 %		

IX. HOW TO DO WELL IN THIS COURSE (POLICIES / REQUIREMENTS)

During classes: Attend class, participate, ask questions, or answer them, if you can. Work on the in-class assignments. In Mathematics, you don't have to believe the teacher, rather (ideally) everything has to be understood. Please interrupt as soon as something is unclear.

Between classes: Class time is precious, so I have to ask you often to read or view some material prior to coming to class. In that case, please write down questions and ask them during class. This model is called the "flipped classroom". Do the homework and submit it at the deadlines to me. Please review the material covered in class also after class. Contact me as soon as problems occur.

If you miss a class, you are expected to find out (by contacting me, for instance) which material was covered and which announcements were made during class. Please don't leave during class. Please focus on the material during class and don't do anything else. Computers are banned for most of the parts of the class, cellphones are banned for all parts.

Calculator Policy: You are encouraged to use any type of calculator on homework assignments and projects. Simple calculators are also allowed in quizzes, and tests, but more sophisticated calculators may be banned in certain quizzes and parts of tests.

X. ACADEMIC INTEGRITY: STATEMENT ON CHEATING AND PLAGIARISM

A student whose actions are deemed by the University to be out of sympathy with the ideals, objectives or the spirit of good conduct as fostered by the University and Swiss community, may be placed on Disciplinary Probation or become subject to dismissal from the University. Cheating and plagiarism are dishonest actions that run counter to the University ideals. Furthermore, cheating reflects negatively on one's personal integrity and is unjust to other students.

See the Academic Catalog for full statement (page 199):
https://www.fus.edu/files/FUS-academic-catalog-2018-2020.pdf

In particular, all work submitted must be your own work, and in tests you are not allowed to use notes, cell phones, talk with other students, or copy their work. In case of a violation you will get 0 points for the assignment and be reported to the Dean of Academic Affairs.

XI. RESOURCES AVAILABLE

If you have questions, I am the first person to contact. You can come during office hours but also send me an email if these hours don't work for you. Then we can find another time. The Writing and Learning Center (WLC) also offers help in Mathematics and for the writing part of the project.

XII. TENTATIVE COURSE SCHEDULE

Week 1: Introduction, Syllabus, Functions, 1.1-1.3 // 1.4,
Week 2: Limits 1.5, Continuity 1.6, // Slope, the Derivative, 2.1, Quiz #1,
Week 3: Elementary Techniques of Differentiation, 2.2, Product and Quotient Rules 2.3, // Chain Rule 2.4, Quiz #2,
Week 4: Implicit Diff, 2.6 // Related Rates 2.6,
Week 5: Projects // 3.1, 3.2, 3.3, Quiz #3,
Week 6: Optimization, 3.4 // Applied Optimization 3.5,
Week 7: Midterm // Exp/Log. Functions 4.1, 4.2
Two weeks of Academic Travel
Week 8: Diff. Of Log/Exp Fcts., 4.3, // Antidifferentiation, 5.1 ,
Week 9: // Integration by Substitution, 5.2, Quiz #4,
Week 10: The Definite Integral and the Fundamental Theorem 5.3, // Open Business
Week 11: Area 5.4, amd Applications 5.5, // Integration by Parts 6.1, Quiz #5,
Week 12: Differential Equations 6.2, // Density Functions 6.4, Quiz #6,
Week 13: Income Distributions, Lorenz Curve and Gini index, // Review,

Final: Thursday December 13, 11:00-13:00

The schedule of the quizzes and the midterm may change.