Course website

http://math.pugetsound.edu/~jbernhard

Contact information

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For my office hours, see the course website. My office phone number is 253.879.3812, but the phone is usually one of the slowest ways to reach me. Email is usually much faster. (All of my email is forwarded to another account, so you may receive email from me at that account as well.) Neither phone nor email will necessarily reach me “after hours” (on nights and weekends), so please take that into account when you contact me via either one.

The course website is the best resource for information about the course. Among other things, it contains a complete calendar for the semester, including all assignments. Also, if you email me a password when I request one, you will be able to access your grade-to-date any time during the semester via the course website.

Learning outcomes

Upon completion of this course, students will be able to:

• read and write mathematical proofs, in the higher mathematics sense of the term.

• understand introductory linear algebra, more specifically the fundamental aspects of vector spaces and linear transformations.

We will study linear algebra for its intrinsic interest, for its applications, and as an introduction to reading and writing mathematical proofs.

Prerequisites

The prerequisite for this course is Mathematics 181 (Calculus II) or the equivalent. If you have not met this requirement or are not sure if this is an appropriate course for you, please see me and we can discuss the course’s suitability.

Course materials

There are two required texts for this class:
1. *Abstract and Applied Linear Algebra*, the first two chapters of a textbook that I am writing on the subject. This is available at the campus bookstore.

2. *Linear algebra*, by Jim Hefferon, a free textbook that can be found online at

   http://joshua.smcvt.edu/linearalgebra/

   No particular technology is required for this course, although access to a computer will be helpful (for word processing and such). We will not use calculators or computers for most of the mathematics in the course, but toward the end of the semester, when you have gained a good understanding of the material, we will talk about how to do so in order to speed up your linear algebraic calculations. You will be required to use \LaTeX{} to typeset your proof-writing problems in this class. Most of you will not be familiar with how to do this, so we will cover it as needed in class.

## Coursework

There is no final exam for this course. The course is finished on the last day of class.

The **homework assignments** are to help you learn the course material and to develop your mathematical writing skills. I encourage you to work with others, including me, on the homework assignments in any way that helps you achieve these goals. You should be able to earn nearly 100% on all the homework assignments, and if you are not doing so, you are falling behind in the course. If you are genuinely stuck on a problem, you should seek help on it, preferably before it is due. (This is better for both your learning and your grade.)

You will submit your homework assignments on paper, and they may be either hand-written or typed. I will write very few comments on your homework assignments when I grade them. However, you can have as much feedback and interaction as you like on homework problems: just ask! Either before or after the homework assignment is due (preferably before), ask me or your classmates or anyone else who can help you use the homework as a learning tool.

The **proof-writing problems** are to develop your proof-writing skills. You may not work with others on these problems, but you may ask me questions about them any time. You are allowed to rewrite proof problems twice. The first rewrite is due when the next proof-writing assignment is due. The second rewrite is due when the proof-writing assignment after that is due. (We will discuss the exact due dates for the last proof-writing assignments later this semester.)

The proof-writing problems can be quite labor intensive process (for me as well as for you), but the payoff in terms of the mathematical maturity that you develop is immense. I strongly encourage you to revise your proofs meticulously, paying close attention not only to correctness but also to style.

You will submit your proof-writing problems to me by email, and you will typeset them in \LaTeX{}. I am not assuming that you are already familiar with the free, open source mathematics word processor \LaTeX{}, and we will cover how to use it in class. The two main reasons that we will use \LaTeX{} are:

1. Word processing your mathematics helps you learn to write good mathematical prose, and
2. \LaTeX{} is the nearly universal standard for word processing in mathematics and in the mathematical sciences.
LATEX is not hard to use, but it is different from typical word processors, such as Microsoft Word.

The first part of the semester will have two **in-class tests**. Internalizing the material from this part of the course is particularly important, both for the rest of the course and for later mathematical study. Having tests in class is designed to give you an incentive to do this.

The second part of the semester will have two **take-home tests**. While you may eventually want to internalize this material, doing so is not crucial at this point in your mathematical studies. As such, you will be allowed a greater time span and wider access to mathematical resources for these tests.

### Grading

Your grade will be based on **my assessment of your understanding of the material**. By default, I will weight the various components of the course as follows:

- Homework assignments: 20%
- Proof-writing problems: 15%
- Test 1 (in-class): 15%
- Test 2 (in-class): 15%
- Test 3 (take-home): 15%
- Test 4 (take-home): 20%

However, these weights are subject to change due to individual circumstances, so if you believe the above components do not accurately represent your understanding of the material, please let me know. If the circumstances dictate, I can work with you to find another way to demonstrate your understanding of the material.

### Late work policy

I will not accept late work without an appropriate reason, which you should explain to me before the work is late if possible. If you are falling behind or need to turn something in late, please see me so that we can discuss it.

### Attendance policy

I will not be taking attendance in this class. You are responsible for the material that we cover in class whether or not you are in attendance. Since it is extremely difficult to keep up in the course without attending regularly, **I expect absences to be rare**. I do not ordinarily give make-up tests, so if you must be absent during one of those, please let me know as early as possible so that we can discuss the situation.

### Academic honesty

On **homework assignments**, you are allowed to work with anyone (including each other, tutors, and me) on homework problems, as long as you do so in a way that helps you learn the
material. As a specific aspect of this, you may communicate with others orally about homework assignments, and you are allowed to make written scratchwork together with others, but you are not allowed to read even part of anyone else’s homework assignment write-up.

You are not allowed to work with anyone else on the proof-writing problems. You are not allowed to work with anyone on any of the tests, and you should not discuss a test with anyone until the class has completed it and turned it in. If you have any questions on the proof-writing problems or tests, you are allowed to ask me but no one else.

For general information on issues of academic honesty, see the official University of Puget Sound academic honesty policy at:

academic-handbook/academic-integrity/

Classroom Emergency Response Guidance

Please review university emergency preparedness, response procedures and a training video posted at www.pugetsound.edu/emergency/. There is a link on the university home page. Familiarize yourself with hall exit doors and the designated gathering area for your class and laboratory buildings.

If building evacuation becomes necessary (e.g. earthquake), meet your instructor at the designated gathering area so she/he can account for your presence. Then wait for further instructions. Do not return to the building or classroom until advised by a university emergency response representative.

If confronted by an act of violence, be prepared to make quick decisions to protect your safety. Flee the area by running away from the source of danger if you can safely do so. If this is not possible, shelter in place by securing classroom or lab doors and windows, closing blinds, and turning off room lights. Lie on the floor out of sight and away from windows and doors. Place cell phones or pagers on vibrate so that you can receive messages quietly. Wait for further instructions.

Office of Accessibility and Accommodations

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Peggy Perno, Director of the Office of Accessibility and Accommodations, 105 Howarth, 253.879.3395. She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Copyright and Fair Use

Course materials are for educational purposes only and limited to students enrolled in the course. They are protected by copyright law and may not be copied, downloaded, stored, transmitted, shared or changed in any way. For further information, see: http://research.pugetsound.edu/copyright.
Other

Feel free to contact me with any questions you have regarding the course. I very much want each and every one of you to succeed in this class.

I look forward to an enjoyable class with you this semester!