Course Guidelines   Abstract Algebra II
University of Puget Sound   Math 434
Dr. Beezer   Spring 2015

Texts   We will be using *Abstract Algebra: Theory and Applications*, by Thomas W. Judson as our textbook. We will cover material from Chapters 16–23, as described on the attached calendar. This is an open source textbook, which in part means you are free to make unlimited copies. The book's website is abstract.ups.edu. The "2014 Annual Edition" will be the version I will follow for this course—it is your responsibility to be careful about numbering of chapters and exercises if you use an old edition, since several years ago the chapter numbers were slightly different and the exercise numbers have changed slightly.

The book's website has links to help you with the purchase of a physical copy of the book, should you desire one. There is a new, experimental, but very usable, web version of the text available online via the book's website. The numbers of the theorems and examples in this edition have changed dramatically, so be aware of that.

Course Web Page   Off of buzzard.ups.edu/courses.html you can find the link to the course web page. This page will evolve as the course progresses.

Office Hours   My office is in Thompson 303. Making appointments or simple, **non-mathematical** questions can be handled via email — my address is `beezer@ups.edu`. Do not confuse this address with the one used for submitting homework (I only look at the homework address when something is due). I rarely do not receive your email, and I read all of my email all of the time, usually very shortly after receiving it. Urgency of replying varies by the hour, day and nature of the message. Office Hours are 10:00–10:50 on Monday and Friday, and 10:30–11:20 on Tuesday and Thursday. Office Hours are first-come, first-served, so I do not make appointments for these times, nor do you need to ask me if I will be present at these times. You may assume I will be there, unless I have announced otherwise in class or by email. You **may** make an appointment for other times, or just drop by my office to see if I am in. Office Hours are your opportunity to receive extra help or clarification on material from class, or to discuss any other aspect of the course.

Class Preparation   Reading questions will help you prepare for the lectures on each chapter. They are posted on the course webpage, as a single PDF for the entire semester. The course page also includes careful directions about submitting your responses. These are due to me by 6:00 AM the morning of the day when we begin discussing a new chapter, as indicated on the schedule and announced in class. Under no circumstances will they be accepted late. These should be submitted to the email address announced in class, **not** my `beezer@ups.edu` address.
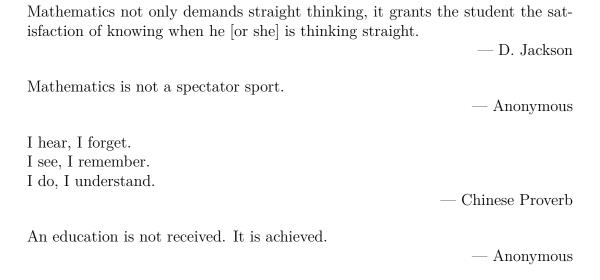
Computation   Abstract algebra has become increasingly important for applications to digital technologies. We have covered efficient digital communication in Chapter 8 ("Algebraic Coding Theory") and cryptography (a key component of the Internet) in Chapter 7 ("Introduction to Cryptography"). Both subjects employ more advanced topics from this semester,

such as finite fields. Conversely, digital technologies are an ideal assistant for studying the subject. So computation will be a feature of the course.

For this reason, we will make extensive use of Sage. Since Sage is open source software, it is available freely in many places. Your default installation is the on-campus server at sage.pugetsound.edu which will be running the latest version of Sage (6.5) within the Sage Notebook interface. If you want to access this server from off-campus, learn to use the university's vDesk software or virtual private network (VPN). You might like using the (experimental) SageMath Cloud at cloud.sagemath.com for your own experiments, but you will need to submit Sage exercises as Sage worksheets generated by the Sage Notebook. Availability, version incompatibility or convenience of other sites is not an excuse for not being able to use Sage.

For each chapter there will be assigned exercises to work in Sage. These will be due roughly on the discussion day following the lectures for each chapter, as a Sage worksheet attached to an email sent to the same address as for the reading questions. We will discuss this procedure in class. Exact due dates will be announced in class. Under no circumstances will they be accepted late.

Practice   Exercises from the text will be suggested for each chapter. Of course, you are not limited to working **just** these assigned problems and you can find many more in textbooks in the library (ask me for suggestions). We have eight days reserved for discussions when we can talk about these problems. It is your responsibility to be certain that you are learning from the homework exercises. The best ways to do this are to work the problems diligently, start studying them early, and participate in the classroom discussion. If at this point you are still unsure about a problem, then a visit to my office is in order, since you are obviously not prepared for the examination questions. Making a consistent effort outside of the classroom is the easiest way (only way?) to do well in this course.

> Mathematics not only demands straight thinking, it grants the student the satisfaction of knowing when he [or she] is thinking straight.
>
> — D. Jackson

> Mathematics is not a spectator sport.
>
> — Anonymous

> I hear, I forget.
> I see, I remember.
> I do, I understand.
>
> — Chinese Proverb

> An education is not received. It is achieved.
>
> — Anonymous

Project   Each student will research a new topic related to the course (433 and 434) and use this as the subject of a paper and an in-class presentation. Details will be provided separately early in the semester.

Examinations   There will be four 50-minute timed examinations. Planned dates are all listed on the **tentative** schedule. The comprehensive final examination will be given at 8 AM on Friday, May 15. The final exam cannot be given at any other time, so be certain that you do not make any travel plans that conflict, and also be aware that I will allow you to work longer on the final exam than just the two-hour scheduled block of time.

Grades   Grades will be based on the following breakdown:

- Examinations: 40%

- Sage: 20%

- Reading Questions: 5%

- Project: 15%

- Final Examination: 20%

Attendance and improvement will be considered for borderline grades. Scores will be posted anonymously on the web at a link off the course page.

Reminders   Here are three reminders about important university policies contained in the *Academic Handbook*. These are described thoroughly online at http://www.pugetsound.edu/student-life/student-handbook/academic-handbook/, or a printed copy may be requested from the Registrar's Office (basement of Jones Hall).

"Regular class attendance is expected of all students. Absence from class for any reason does not excuse the student from completing all course assignments and requirements." (Registration for Courses of Instruction, Non-Attendance)

Withdrawal grades are often misunderstood. A Withdrawal grade (W) can only be given prior to the university deadline listed on our course schedule, and after that time (barring unusual circumstances), the appropriate grade is a Withdrawal Failing (WF), **even if your work has been of passing quality**. See the attached schedule for the last day to drop with an automatic 'W'. (Grade Information and Policy, Withdrawal Grades)

All of your graded work is expected to be entirely your own work, this includes Reading Questions and Sage. Anything to the contrary is a violation of the university's comprehensive policy on Academic Integrity (cheating and plagiarism). Discovered incidents will be handled strictly, in accordance with this policy. Penalties can include failing the course and range up to being expelled from the university. (Academic Integrity)

Purpose   At this point in your college career, you should be well on your way to being an independent scholar, who appreciates the beauty of mathematics and understands the effort needed to master new and difficult ideas. Consistent with that, I will be giving you a fair degree of freedom to learn this material in a manner that suits you.

Read the book before the lectures, work the exercises diligently, tidy up your class notes each evening, and ask questions. Arriving late to class, or having conversations with others during class, not only disrupts your peers, but tells me you are not serious about your education.

"Modern" algebra is the basis of one of the two main branches of mathematics (analysis being the other). So every mathematician should have a basic understanding of its principal

concepts. The investment of your time and energy applied to studying it will be amply repaid by a full understanding of its deeper ideas.

Conduct Daily attendance is required, expected, and overall a pretty good idea. Class will begin on-time, so be here, settled-in and ready to go. In other words, walking in the door at the exact time class is to begin is not acceptable. Repeated tardieness and absences will result in grade penalties, in accordance with university policies. Do not leave class during the lecture unless there is a real emergency — fill your water bottles, use the toilet, and so on, **in advance**. I do not care how much food or drink you bring to class, so long as it does not distract others or make me hungry. Please do not offer me sweets. Please keep phones in your pocket or bag, unless you are using them to read course material. In short, we are here to learn and discuss mathematics. It is your responsibility to not distract your peers who are serious about their education or distract me as I endeavor to make the best use of the class time for everybody.

Student Accessibility and Accommodation "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 Accommodation, 105 Howarth, 253.879.3395. She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential."

I request that you give me at least two full working days to respond to any requests from this office.

Student Beravement Policy "Upon approval from the Dean of Students Office, students who experience a death in the family, including parent, grandparent, sibling, or persons living in the same household, are allowed three consecutive weekdays of excused absences, as negotiated with the Dean of Students. For more information, please see the Academic Handbook."

Classroom Emergency Response Guidance Please review university emergency preparedness and response procedures posted at http://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.

Tentative Daily Schedule

Monday	Tuesday	Thursday	Friday
Jan 19 MLK Day	Jan 20 Guest Lecture Prof. B. Smith	Jan 22 Guest Lecture Prof. B. Smith	Jan 23 Guest Lecture Prof. B. Smith
Jan 26 Chapter 16	Jan 27 Chapter 16	Jan 29 Chapter 16	Jan 30 Chapter 16
Feb 2 Chapter 16 Last Day to Drop Without Record	Feb 3 Problem Session	Feb 5 Chapter 17	Feb 6 Chapter 17
Feb 9 Chapter 17	Feb 10 Chapter 17	Feb 12 Chapter 17	Feb 13 Problem Session
Feb 16 Exam 1 Chapters 16, 17	Feb 17 Chapter 18	Feb 19 Chapter 18	Feb 20 Chapter 18
Feb 23 Chapter 18	Feb 24 Chapter 18	Feb 26 Problem Session	Feb 27 Chapter 19
Mar 2 Chapter 19	Mar 3 Chapter 19	Mar 5 Chapter 19	Mar 6 Problem Session
Mar 9 Exam 2 Chapters 18, 19	Mar 10 Chapter 20	Mar 12 Chapter 20	Mar 13 Chapter 20

Spring Break

Tentative Daily Schedule

Monday	Tuesday	Thursday	Friday
Mar 23 Chapter 20	Mar 24 Problem Session	Mar 26 Chapter 21	Mar 27 Chapter 21 Last Day to Drop With Automatic W
Mar 30 Chapter 21	Mar 31 Chapter 21	Apr 2 Chapter 21	Apr 3 Problem Session
Apr 6 Exam 3 Chapters 20, 21	Apr 7 Chapter 22	Apr 9 Chapter 22	Apr 10 Chapter 22
Apr 13 Chapter 22	Apr 14 Chapter 22	Apr 16 Problem Session	Apr 17 Chapter 23
Apr 20 Chapter 23	Apr 21 Chapter 23	Apr 23 Chapter 23	Apr 24 Chapter 23
Apr 27 Chapter 23	Apr 28 Problem Session	Apr 30 Exam 4 Chapters 22,23	May 1 Presentations
May 4 Presentations	May 5 Presentations	May 7 Reading Period	May 8 Reading Period

Final Examination: Friday, May 15, 8 AM

Chapter	Suggested Exercises Computational	Theoretical
16	1, 3, 5, 6, 7, 8, 9, 10, 12	2, 16, 19, 20, 24, 26, 27, 28, 33, 36, 38
17	3bc, 4ab, 5ab, 7, 8, 10, Additional: 2-8	13, 14, 17, 18, 19, 23, 24, 25
18	1, 10, 15	5, 7, 9, 11, 12, 13, 14, 17, 19
19	1, 2, 3, 5, 11	12, 13, 15, 16, 18, 21, 22, 23
20	3, 4, 9	10, 13, 16, 18 (maybe more to come)
21	1, 2, 3bcd, 4, 6, 8, 9	11, 16, 19, 20, 21
22	1bc, 3, 4, 7, 8	14, 15, 17, 18, 21
23	1, 2, 3, 4, 5, 11	6, 7, 9, 12, 13, 14, 20