

Course Guide Abstract Algebra I: Fall 2018:

*Required = assignments you turn in on the indicated days, at the start of class, Missions 1,2,...,8 (in total 240pts)

		Topic	Notes	Required*
	Prequel 1	integers: properties, divisibility, euclidean algorithm		
	Prequel 2	modular integers: construction and properties		
	Prequel 3	permutations and cycle notation		
M: 8-27	Lecture 1	intro. & select history of abstract algebra: groups, rings, fields		
W: 8-29	Lecture 2	examples of groups		
F: 8-28	Lecture 3	isomorphism		
M: 9-3	Lecture 4	subgroups and isomorphism		Mission 1
W: 9-5	Lecture 5	on symmetry and the dihedral group		
F: 9-7	Lecture 6	cyclic groups		
M: 9-10	Lecture 7	subgroups and generators		Mission 2
W: 9-12	Lecture 8	the direct product group and homomorphism		
F: 9-14	Lecture 9	isomorphism and Cayley's Theorem		
M: 9-17	Lecture 10	discussion		Mission 3
W: 9-19	Test 1	covers through Lecture 10		
F: 9-21	Lecture 11	cosets and Lagrange's Theorem		
M: 9-24	Lecture 12	quotient groups		
W: 9-26	Lecture 13	direct products inside and outside		
F: 9-28	Lecture 14	on units of Z_n and encryption		
M: 9-31	Lecture 15	the isomorphism theorem		
W: 10-3	Lecture 16	group actions and the orbit stabilizer theorem		Mission 4
		Fall Break: no class on 10-4 & 10-5		
M: 10-8	Lecture 17	conjugacy and the class equation		
W:10-10	Lecture 18	matrix groups		
F: 10-12	Lecture 19	matrix Groups		
M: 10-15	Lecture 20	discussion		Mission 5
W: 10-17	Test 2	Covers through Lecture 20		
F:10-19	Lecture 21	rings and integral domains		
M:10-22	Lecture 22	ideals and factor rings		
W:10-24	Lecture 23	prime and maximal ideals		
F: 10-26	Lecture 24	ring homomorphism & the field of fractions		
M:10-29	Lecture 25	polynomials in an indeterminate		
W:10-31	Lecture 26	factorization of polynomials		Mission 6
F:11-2	Lecture 27	divisibility in integral domains I		
M:11-5	Lecture 28	divisibility in integral domains II		
W:11-7	Lecture 29	extension fields		
F: 11-9	Lecture 30	algebraic extensions		
M: 11-12	Lecture 31	Discussion		Mission 7
W: 11-14	Test 3	Covers through Lecture 31		
F: 11-16	Lecture 32	Algebra		
		Thanksgiving Break: no class 11-19 to 11-23		
M: 11-26	Lecture 33	Algebra		
W:11-28	Lecture 34	Algebra		
F:11-30	Lecture 35	Algebra		Mission 8
M:12-3	Lecture 36	Algebra		
W:12-5		Reading Day		
		Final Exam: TBA. do not plan to leave early.		

Course Guide Abstract Algebra I: Fall 2018:

1. The primary text is my Lecture Notes. I also recommend Beachy and Blair and Gallian's 5-th edition of Contemporary Abstract Algebra for additional reading and examples. This Course Plan gives you a good indication of what I am likely to cover on a given day. I usually stick close to my schedule.
2. The Lecture Notes from 2016 have lots of interesting examples and problems suggested (solutions are posted on my website). However, please remember what I say and publish this semester is key. One important point stands out, the definition of ring in the 2016 notes is the one found in Gallian and I do not think it's the best choice. We assume a ring has a multiplicative identity by default whereas Gallian does not. This is one of the major differences in the revised notes which I'm editing for Math 421 of Fall 2018.
3. Sorry about asking you to watch the Prequel Lectures. The university deleted a week from Fall 2018 and I needed to do something in order to maintain the content and excellence of the course. Besides that, I think the material covered in Prequel Lectures would actually better be seen in Math 200. However, this has not happened at this time. Still, many of you have already seen the proper and careful development of the division algorithm and modular arithmetic. Probably the Prequel lecture on permutations is new to everyone and I used to cover that inside the standard 14 week semester.
4. Each lecture is important. I expect you to attend. In addition, I expect you to study as the course progresses. I have many office hours and the Help Session where I can help you understand things that might not have made sense the first time in lecture.
5. Certain proofs in lecture have been relegated to the homework or as an exercise for the reader. If I say "this would make a nice test question" perhaps that is a hint.
6. Homework is really important. Homework in upper level math courses should be attempted during multiple sessions. Ideally, I'd like to see you working with a group, but, also alone. The best way a homework group works is when all the participants attempt the homework on their own **before** meeting. Remember, homework is designed in my courses to provoke you to think. Think for yourself. It's ok to check answers, strategies etc... but, remember, eventually you must make the material your own.
7. Grading: usual 1000pt scale with:
 - Test 1 = 140pts,
 - Test 2 = 140pts,
 - Test 3 = 140pts
 - Quizzes = 50pts, (typically take-home, will have a short time to finish, may or may not warn in advance)
 - Missions = 240pts,
 - Class Participation & Survey = 10pts, (if everyone completes the survey then I allow a page of notes for final)
 - Final = 280pts. (comprehensive)

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Recommended Homework from Beachy and Blair 3rd edition:

Note, the text by Beachy and Blair, 3rd Edition of *Abstract Algebra* is an excellent supplement to my notes. I provide a list of recommended homework problems following this schedule. The recommended homework is not collected, however you can ask for solution sketches in our weekly review session.

1.1# 3, 5, 12
1.2#11, 18
1.3#3, 18
1.4#1, 3, 22
2.1#10, 14
2.2#5, 10, 12
2.3#1, 3
3.1#9, 11, 15, 17, 24
3.2#5, 7, 9, 12, 14, 15, 17, 19, 24
3.3#1, 3, 4, 5, 6, 7, 9, 11, 13, 18
3.4#2, 4, 5, 6, 8, 9, 10, 12, 13, 17, 18, 19, 20, 21, 23, 24
3.5#3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 17, 19
3.6#1, 2, 3, 6, 8, 12, 13, 14, 16, 18, 19, 21, 24, 26, 27
3.7#1, 3, 4, 6, 7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 20
3.8#1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 22, 23, 24, 25, 27, 28
4.1#2, 3, 5, 10, 11, 12, 13, 14, 18, 24
4.2#2, 4, 5, 6, 5, 8, 9, 11, 15, 16, 17, 18, 19, 20
4.3#3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18, 19, 20, 21, 22, 23
4.4#3, 4, 5, 6, 8, 9, 11, 12, 13, 20
5.1#1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
5.2#1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 20, 23
5.3#1, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 24, 25,
5.4#2, 4, 6, 7, 9, 11, 12, 13, 14