

Math 464/564: Graduate Algebra 2

MWF 9:00am - 9:50am, 453 HBH. See Syllabus for details
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[Final Version]

Lect #	Date	Algebraic Structure/ Broad Topic	Sub-topic (Notes in Dropbox folder) ** Not on Qualifying Exam	Section(s) of Dummit and Foote 3rd edition	Section(s) of supplementary texts/ comments	Homework Due Date Exam Date
1	M 1/9/2023 Start of Course	Rings	Review of Graduate Algebra 1 Field Extensions	— 13.1		
2	W 1/11/2023	Fields	Field Extensions Algebraic Extensions	13.1 13.2		
3	F 1/13/2023	Fields	Algebraic Extensions	13.2		HW #0 Due
4	W 1/18/2023 (after MLK Day)	Fields	Splitting Fields and Algebraic Closure Cyclotomic Polynomials and Extensions	13.4 13.6		HW #1 Due
5	F 1/20/2023	Fields	Cyclotomic Polynomials and Extensions Separable and Inseparable Extensions	13.6 13.5		
6	M 1/23/2023	Fields	Intro to Galois theory	14.1		
7	W 1/25/2023	Fields	Intro to Galois theory Fund. Thm. Of Galois theory	14.1 14.2		HW #2 Due
8	F 1/27/2023	Fields	Fund. Thm. Of Galois theory Finite Fields	14.2 14.3		
9	M 1/30/2023	Fields	Composite Extns and Simple Extns	14.4		
10	W 2/1/2023	Fields	Cyclotomic Extensions and Abelian Extensions over \mathbb{Q}	14.5		HW #3 Due
11	F 2/3/2023	Fields	Galois Groups of Polynomials	14.6		
12	M 2/6/2023	Fields	Solvable and Radical Extensions	14.7		
13	W 2/8/2023	Fields	Transcendental Extensions, Inseparable Extensions, and Infinite Galois Groups	14.9		HW #4 Due
14	M 2/13/2023 (after Spring Recess)	Algebras	Algebras, Generators and Relations**, Various Examples**	—	CW book	
15	W 2/15/2023	Various Algebras	Review of Universal Property Tensor Algebras Graded Algebras	11.5	CW book	HW #5 Due
16	F 2/17/2023	Algebras	Symmetric, Exterior (Alternating) Algs Tensor Product, Free Product of Algs	11.5	CW book	
17	M 2/20/2023	Algebras	More on Exterior (Alternating) Algebras	11.5	CW book	
18	W 2/22/2023	—	—	—	—	EXAM 1 (thru material on 2/15)
19	F 2/24/2023	Various	Direct and Inverse Limits			
20	M 2/27/2023	Modules	Exact sequences Snake Lemma	10.5		
21	W 3/1/2023	Modules	Exact functors Flatness	10.5		HW #6 Due
22	F 3/3/2023	Modules	Projectivity and Injectivity	10.5		
23	M 3/6/2023	Homological Algebra	Projectivity and Injectivity II	10.5		
24	W 3/8/2023	Homological Algebra	Derived Functors: Tor	17.1		HW #7 Due
25	F 3/10/2023	Homological Algebra	Derived Functors: Ext	17.1		
26	M 3/20/2023 (after Spring Break)	Advanced Ideal Theory	Chain conditions: Noetherian, Artinian Krull dimension**	15.1. 16.1	Atiyah - MacDonald, Chap 6	
27	W 3/22/2023	Algebraic Geometry	Affine Varieties**, Coordinate Algebras**	15.1	K. Smith's book, Chap 1	HW #8 Due
28	F 3/24/2023	Advanced Ideal Thy Algebraic Geometry	Radical Ideals Hilbert's Nullstellensatz Zariski topology**	15.2	K. Smith's book, Chap 2	
29	M 3/27/2023	Advanced Ideal Theory	Primary Decomposition	15.2	Atiyah - MacDonald, Chap 4	
30	W 3/29/2023	Advanced Ideal Theory	Integral Extensions Extension and Contraction	15.3	Atiyah - MacDonald, Ch 1,5	HW #9 Due
31	F 3/31/2023	Advanced Ideal Theory	Going-Up Theorem Going-Down Theorem	15.3	Atiyah - MacDonald, Chap 5	
32	M 4/3/2023	Advanced Ideal Theory	Algebraic Integers	15.3	Atiyah - MacDonald, Chap 5	
33	W 4/5/2023	Advanced Ideal Theory	Localization I	15.4	Atiyah - MacDonald, Chap 3 (+ some subsequent chaps)	HW #10 Due
34	F 4/7/2023	Advanced Ideal Theory	Localization II	15.4	Atiyah - MacDonald, Chap 3 (+ some subsequent chaps)	
35	M 4/10/2023	Advanced Ideal Theory	Localization III	15.4	Atiyah - MacDonald, Chap 3 (+ some subsequent chaps)	
36	W 4/12/2023	—	—	—	—	EXAM 2 (thru material on 4/7)
37	F 4/14/2023	Algebraic Geometry	Prime Spectrum and Maximal Spectrum**	15.5	Selection of K. Smith's book, Chap 2	
38	M 4/17/2023	Algebraic Geometry	Projective Varieties I**		Selection of K. Smith's book	
39	W 4/19/2023	Algebraic Geometry	Projective Varieties II**		Selection of K. Smith's book	HW #11 Due
40	F 4/21/2023 End of Course	Algebraic Geometry	Projective Varieties III**		Selection of K. Smith's book	