

Math 464/564: Graduate Algebra 2						
MWF 10:00am - 10:50am, HBH 453. See Syllabus for details Instructor: Dr. Chelsea Walton. notlaw@rice.edu						
[Final Version]						
Lect #	Date	Algebraic Structure/ Broad Topic	Sub-topic (Notes in Dropbox folder)	Section(s) of Dummit and Foote 3rd edition	Section(s) of supplementary texts/ comments	Homework Due Date Exam Date
1	M 1/13/2025 Start of Course	Modules	Review of Algebraic Structures, Universal Property, especially Modules	10.1-10.4		
2	W 1/15/2025	Modules	Tensor Products of Modules	10.4		
3	F 1/17/2025	Modules	Tensor Products of Modules	10.4		HW #0 Due
4	W 1/22/2025 (after MLK Day)	Modules	Modules over PID	12.1		HW #1 Due (on Lects 1, 2, 3)
5	F 1/24/2025	Modules	Canonical Forms	12.2, 12.3		
6	M 1/27/2025	Fields	Field Extensions	13.1		
7	W 1/29/2025	Fields	Field Extensions Algebraic Extensions	13.1 13.2		HW #2 Due (on Lects 4, 5)
8	F 1/31/2025	Fields	Algebraic Extensions	13.2		
9	M 2/3/2025	Fields	Splitting Fields and Algebraic Closure Cyclotomic Polynomials and Extensions	13.4 13.6		
10	W 2/5/2025 PRE-RECORDED	Fields	Cyclotomic Polynomials and Extensions Separable and Inseparable Extensions	13.6 13.5		HW #3 Due (on Lects 6, 7, 8)
11	F 2/7/2025 PRE-RECORDED	Fields	Intro to Galois theory	14.1		
12	M 2/10/2025	Fields	Intro to Galois theory Fund. Thm. Of Galois theory	14.1 14.2		
13	W 2/12/2025	Fields	Fund. Thm. Of Galois theory Finite Fields	14.2 14.3		HW #4 Due (on Lects 9, 10, 11)
14	M 2/17/2025 (after Spring Recess)	Fields	Composite Extns and Simple Extns	14.4		
15	W 2/19/2025	Fields	Cyclotomic Extensions and Abelian Extensions over $\mathbb{Q}$	14.5		
16	F 2/21/2025	Fields	Galois Groups of Polynomials	14.6		HW #5 Due (on Lects 12, 13, 14, 15)
17	M 2/24/2025	Fields	Solvable and Radical Extensions	14.7		
18	W 2/26/2025 PRE-RECORDED	Fields	Transcendental Extensions, Inseparable Extensions, and Infinite Galois Groups	14.9		
19	F 2/28/2025	—	—	—	—	EXAM 1 (thru material on 2/24)
20	M 3/3/2025	Algebras	Algebras, Generators and Relations Various Examples	—	CW book 1.1.5 and 1.2	
21	W 3/5/2025	Algebras	Review of Universal Property Tensor Algebras Graded Algebras	11.5	CW book 1.1.4iii, 1.2.2 and 1.2.7	HW #6 Due (on Lects 16, 17, 18)
22	F 3/7/2025	Algebras	Symmetric and Exterior Algebras	11.5	CW book 1.2.3 and 1.2.4	
23	M 3/10/2025	Algebras	Symmetric and Exterior Algebras	11.5		
24	W 3/12/2025	Category Theory	Categories, Functors	—	CW book 2.1, 2.3.1, 2.3.2	
25	F 3/14/2025	Category Theory	Natural Transformations and Equivalence	—	CW book 2.3.4 and 2.4	HW #7 Due (on Lects 20, 21, 22, 23)
26	M 3/24/2025 (after Spring Break)	Various	Direct and Inverse Limits			
27	W 3/26/2025	Homological Algebra	Exact sequences Snake Lemma	10.5		HW #8 Due (on Lects 24, 25)
28	F 3/28/2025	Homological Algebra	Exact functors Flatness	10.5		
29	M 3/31/2025	Homological Algebra	Projectivity and Injectivity	10.5		
30	W 4/2/2025	Homological Algebra	Projectivity and Injectivity II	10.5		HW #9 Due (on Lects 26, 27, 28)
31	F 4/4/2025	Homological Algebra	Derived Functors: Tor	17.1		
32	M 4/7/2025	Homological Algebra	Derived Functors: Ext	17.1		
33	W 4/9/2025	Advanced Ideal Theory	Chain conditions: Noetherian, Artinian Krull dimension	15.1. 16.1	Atiyah - MacDonald, Chap 6	
34	F 4/11/2025	Algebraic Geometry	Affine Varieties , Coordinate Algebras	15.1	K. Smith's book, Chap 1	HW #10 Due (on Lects 29, 30, 31, 32)
35	M 4/14/2025	Advanced Ideal Thy Algebraic Geometry	Radical Ideals Hilbert's Nullstellensatz Zariski topology	15.2	K. Smith's book, Chap 2	
36	W 4/16/2025	Advanced Ideal Theory	Primary Decomposition	15.2	Atiyah - MacDonald, Chap 4	
37	F 4/18/2025	—	—	—	—	EXAM 2 (thru material on 4/14)
38	M 4/21/2025 PRE-RECORDED	Advanced Ideal Theory	Integral Extensions Extension and Contraction	15.3	Atiyah - MacDonald, Ch 1,5	
39	W 4/23/2025 PRE-RECORDED	Advanced Ideal Theory	Going-Up Theorem Going-Down Theorem	15.3	Atiyah - MacDonald, Chap 5	
40	F 4/25/2025 PRE-RECORDED End of Course	Advanced Ideal Theory	Algebraic Integers Hilbert's Nullstellensatz	15.3	Atiyah - MacDonald, Chap 5	HW #11 Due (on Lects 33–36, 38)