

# ALGEBRAIC NUMBER THEORY SYLLABUS AND ASSIGNMENTS

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Last updated January 1, 2019. To be updated as necessary, as the quarter progresses.

## WEEK 1

Tuesday (1/8): Introduction the course, rings of integers (Chapter 2 of Milne)

Thursday (1/10): Rings of integers (Chapter 2 of Milne)

Due Friday:

Nothing to submit, but review the preliminaries from commutative algebra from Chapter 1 of Milne's *Algebraic Number Theory*, if they are not currently fresh in your mind.

## WEEK 2

Tuesday (1/15): Dedekind domains and dvrs (Chapter 3 of Milne)

Thursday (1/17): Ideal class groups and the structure of Dedekind domains (Chapter 3 of Milne)

Due 10 am Friday:

\*Any typed problems you wish to submit from Assignment 1. If you'd like instead to schedule presentations of summaries of solutions, please let me know by the end of today.

\*Notes from Week 1 (for any assigned days)

## WEEK 3

Tuesday (1/22): More on ideal class groups and the structure of Dedekind domains (Chapter 3 of Milne)

Thursday (1/24): Finiteness of the class number (Chapter 4 of Milne)

Due 10 am Friday:

\*Notes from Week 2 (for any assigned days)

## WEEK 4

Tuesday (1/29): More on class groups and class numbers (Chapter 4 of Milne)

Thursday (1/31): Dirichlet's unit theorem (Chapter 5 of Milne)

Due 10 am Friday:

\*Any typed problems you wish to submit from Assignment 2. If you'd like instead to schedule presentations of summaries of solutions, please let me know by the end of today.

\*Notes from Week 3 (for any assigned days)

\*Also, review the basics of cyclotomic extensions (using any abstract algebra textbook that covers Galois theory), if they are not currently fresh in your mind.

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*Date:* January 1, 2019.

## WEEK 5

Tuesday (2/5): More on unit groups (Chapter 5 of Milne)

Thursday (2/7): Applications of what we have been learning to the special case of certain cyclotomic extensions (Chapter 6 of Milne)

Due 10 am Friday:

\*Notes from Week 4 (for any assigned days)

## WEEK 6

Tuesday (2/12): Fermat's Last Theorem for regular primes, more on cyclotomic extensions (Chapter 6 of Milne)

Thursday (2/14): Absolute values and discrete valuations (Chapter 7 of Milne)

Due 10am Friday:

\*Any typed problems you wish to submit from Assignment 3. If you'd like instead to schedule presentations of summaries of solutions, please let me know by the end of today.

\*Notes from Week 5 (for any assigned days)

## WEEK 7

Tuesday (2/19): Local fields (Chapter 7 of Milne)

Thursday (2/21): More on the structure of local fields (Chapter 7 of Milne)

Due 10 am Friday:

\*Notes from Week 6 (for any assigned days)

## WEEK 8

Tuesday (2/26): More on the structure of local fields (Chapter 7 of Milne)

Thursday (2/28): Global fields (Chapter 8 of Milne)

Due 10 am Friday:

\*Any typed problems you wish to submit from Assignment 4. If you'd like instead to schedule presentations of summaries of solutions, please let me know by the end of today.

\*Notes from Week 7 (for any assigned days)

## WEEK 9

Tuesday (3/5): Global fields (Chapter 8 of Milne)

Thursday (3/7): Global fields (Chapter 8 of Milne)

Due 10 am Friday:

\*Notes from Week 8 (for any assigned days)

\* If you'd like to schedule presentations of summaries of solutions from Assignment 5, please let me know by the end of today.

## WEEK 10

Tuesday (3/12): TBA

Thursday (3/14): TBA

Due 10 am Friday:

\*Notes from Week 9 (for any assigned days)

\*Notes from Week 10 (for any assigned days)

\*Any typed problems you wish to submit from Assignment 5.