

**Modern algebra – Math 612**  
**University of Hawai‘i at Mānoa**  
**Spring 2019**

**Meetings:** TTh 1:30pm–2:45pm, Keller 402

**Lecturer:** Robert Harron

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Office            Keller 407

Office Hours    to be determined

**Course website:** <http://math.hawaii.edu/~rharron/teaching/math612s19/>

**Optional textbook:** David Dummit & Richard Foote’s *Abstract algebra, Third edition*

**Other sources:** Lang’s *Algebra, 3rd edition* (a standard graduate reference), Rotman’s *Advanced Modern Algebra, 3rd edition*, Artin’s *Algebra* (an advanced undergraduate book), Keith Conrad’s blurbs (<http://www.math.uconn.edu/~kconrad/blurbs/>)

**Description:** We will cover (hopefully all of) the following topics (all are covered to some extent in Dummit & Foote, and further in Lang and Rotman; additional specific references listed in parentheses below):

- Homological algebra (Lang Ch. XX, Rotman Ch. C-3, Hilton–Stammbach’s *A course in homological algebra*)
- Group cohomology (Serre’s *Local fields*, Milne’s *Class field theory*, Rotman §C-3.9)
- Multilinear algebra (Rotman Ch. B-5, Fulton–Harris’ *Representation theory, a first course* Appendix B)
- Fields and Galois theory (Lang Ch. V & VI, Cox’s *Galois theory*)
- Commutative algebra (Atiyah–Macdonald’s *Introduction to commutative algebra*, Reid’s *Undergraduate commutative algebra*)

**Assignments:** There will be almost-weekly assignments. Problems will be posted after each lecture, then bundled together and due at a specified time each week. Only a subset of the questions will be graded for points. You need not type up your assignments in L<sup>A</sup>T<sub>E</sub>X (you are of course more than welcome to), but what you hand in should be neat and well-presented. Aside from the obvious consequence that I will be able to better read and understand what you are trying to say, it will also bring an added layer of critical thought to your work as writing up an argument you’ve already worked out encourages you to process those thoughts over again and can frequently advance your understanding.

**Exams:** There will be a take-home midterm and a take-home final.

**Grading scheme:** Homework 60%    Midterm 20%    Final 20%