

Information on 18.705, Commutative algebra, Fall 2019

Website:

<https://learning-modules.mit.edu/class/index.html?uuid=/course/18/fa19/18.705>

Topic: This is a graduate-level introduction to commutative algebra for those who have mastered undergraduate algebra. The content is essential for graduate-level study of number theory and algebraic geometry among other subjects, as well as being of interest in its own right.

Prerequisite: 18.702. As usual with graduate subjects, familiarity with other topics may help at times.

Instructor: Bjorn Poonen, 2-243, 617-258-8164, [poonen@math](mailto:poonen@math.mit.edu) (add [.mit.edu](mailto:poonen@math.mit.edu) if off-campus). Math is easier to explain in person, so for involved math questions, coming to office hours is better than emailing! Office hours are listed at <http://math.mit.edu/~poonen/>

Class meetings: MWF 9-10am in 4-153.

Required text: Altman and Kleiman, *A term of commutative algebra*, Worldwide Center of Mathematics, version of March 11, 2018. Download the e-book version for \$0.

Other good books on commutative algebra:

- Atiyah and MacDonald, *Introduction to commutative algebra*, Westview Press, 1994. This is a classic, covering many of the most important topics in a very efficient way, in 128 pages. It also is full of exercises. The Altman–Kleiman text advertises itself as “an updated and improved version” of the Atiyah–MacDonald text.
- Eisenbud, *Commutative algebra*. This is a more comprehensive text, including a lot of commentary: 785 pages!
- *The stacks project*, chapter on commutative algebra. This is intended as a reference, not as a textbook to learn from. As of September 22, 2019, the chapter is 446 pages of a book that is 6758 pages and growing.

Assignments:

- Weekly problem sets will be posted online.
- Only students who are or are expecting to be officially enrolled for credit should submit assignments. If you are intending to remain a Listener, do not submit assignments; instead you can self-grade them using the posted solutions.
- You should not expect to be able to solve every single problem on your own; instead you are encouraged to discuss questions with each other or to come to office hours, so that when you submit an assignment you are pretty sure that it is complete and correct. If you meet with a study group, you will learn best if you do as many problems as you can on your own before meeting. **Write-ups must be done independently.** (This means that it is OK for other people to explain their solutions to you, but you must not be looking at other people’s solutions as you write your own.)
- \LaTeX is preferred (see Grätzer, *More math into \LaTeX* , Springer-Verlag, 2016 for help), but not required. If you are writing solutions by hand, please scan them into PDFs.

- Write in complete sentences whenever reasonable.
- At the top of each problem set you submit, write either the text “Sources consulted: none” or a list of all sources consulted other than the textbooks listed above. **This is required.** (Examples of things that should be listed if consulted: a classmate, a tutor, a friend, a website, a textbook, solutions from a previous semester, etc.)
- Completed assignments should be submitted online before 11:59 P.M. on the due date.
- Assignments submitted after solutions are posted will not be accepted.

Grading: Based exclusively on homework. No exams.

If a personal or medical issue is interfering with your studies:

- Contact your medical provider if you need medical attention.
- Please do not come to class if you are potentially contagious. Instead read the sections in the textbook you missed.
- Email me.
- Undergraduates: If it is an extended illness or serious personal problem, one that will cause you to miss completing an assignment, then please discuss this with Student Support Services (S³). You may consult with S³ in 5-104 or call 617-253-4861. Also, S³ has walk-in hours Monday–Friday, 10–11am and 2–3pm. The deans in S³ will verify your situation, and then discuss with you how to address the missed work. Undergraduates will not be excused from coursework without verification from S³. If you have some other kind of conflict (e.g., varsity sports game), email only me (not a dean) as far in advance as possible, and I will make a decision on how to proceed.
- In case of financial hardship, consider consulting the ARM Coalition.

If you need disability accommodations: Please speak with Kathleen Monagle, Associate Dean in Student Disability Services (SDS) in 5-104 or call 617-253-1674, ideally before the semester begins. If you have a disability but do not plan to use accommodations, it is still recommended that you meet with SDS staff to familiarize yourself with the services and resources of the office. If you have already been approved for accommodations, please bring the accommodation letter to Theresa Cummings, 617-253-4977 in Mathematics Academic Services 2-110 early in the semester.

Other important things:

- It is your responsibility to email me as far in advance as possible in case of an extended absence, or in case you find yourself struggling with the course for any reason.
- If you have emergency medical information you wish to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately: feel free to talk to me privately after class or in my office.