Math 918, Spring 2026: F-singularities

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Office Hours:
TBA
TBA

Class schedule:
Tu/Th 11–12:15 (Avery 112)

Content. This course will be an introduction to prime characteristic commutative algebra, with a focus on "F-singularities". We will cover the four main kinds (strong F-regularity, F-splitting/F-purity, F-rationality, and F-injectivity), and see connections to other subfields of commutative algebra & algebraic geometry. My goal is to get everyone to a level where they feel comfortable in the audience of a seminar talk on these topics, as well as to get ideas of where these ideas might connect to your own interests.

Prerequisites. The pre/co-requisites are Math 905 (Commutative Algebra I), Math 953 (Algebraic Geometry), Math 915 (Homological Algebra), and concurrent enrollment in Math 906 (Commutative Algebra II). If you don't have these but are interested, please talk to me!

References. The main references used during this course will be both

- Linquan Ma & Thomas Polstra's F-Singularities: A Commutative Algebra Approach

- Alessio Caminata & Alessandro de Stefani's Notes for course on F-singularities

A list of topics, worksheet previews, and any supplemental notes to the above resources will be posted to the course webpage (soon to be added to my website).

Coursework and grading. The course grade will be based on approximately bi-weekly problem sets. Each problem will be worth star, graded on being "complete and a reasonably relevant effort". If you collect at least 15 stars throughout the semester, you are guaranteed an A. (If I assign fewer total problems than expected I will let you know and lower this number accordingly, but I promise the number won't go up!)

Course Structure. This course will be a mix of lecture and active learning. I aim to post a brief plan of the next lecture (including relevant sections of the reference reading + worksheet if applicable) to the course webpage by the night before. This is my first time teaching a graduate course so if things are/aren't working for you please tell me!

Collaboration & AI Policies. You are allowed (and encouraged!) to discuss homework with your classmates. You are also allowed to "discuss" homework with AI tools such as ChatGPT. In either case, you should state which problem(s) you discussed and with whom. Further, your final writeup should be your own work.

Instructional Continuity Plan. If in-person classes are canceled, you will be notified of the instructional continuity plan for this class by an email to your @huskers.unl.edu email.

UNL Course Policies and Resources. Students are responsible for knowing the university policies and resources found on this page (`https://go.unl.edu/coursepolicies`):

- University-wide Attendance Policy
- Academic Honesty Policy
- Services for Students with Disabilities
- Mental Health and Well-Being Resources
- Final Exam Schedule
- Fifteenth Week Policy
- Emergency Procedures
- Diversity & Inclusiveness
- Title IX Policy
- Other Relevant University-Wide Policies