Algebraic Geometry (Math 494)

Instructor: Sean Lawton
Office Hours: TuTh 3-5pm, EXPL 4413
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Lectures: 1:30 pm - 2:45 pm, TR, Horizon Hall 1011, Aug 23, 2021 - Dec 15, 2021

Required Text: Cox, Little, O'Shea, "Ideals, varieties, and algorithms. An introduction to computational algebraic geometry and commutative algebra." Fourth edition. Undergraduate Texts in Mathematics. Springer, 2015. ISBN: 978-3-319-16720-6; 978-3-319-16721-3

Recommended Prerequisites: Grade of C or better in Math 203 and Math 290/300.

Course Description: Algebraic Geometry has emerged, with the computational power offered by modern computers, as an extremely important and fascinating subject with many applications. We will survey the classical foundation of the subject following the Steele Prize winning textbook of Cox, Little, and O'Shea. We will focus on the first four chapters: 1. Geometry, Algebra, & Algorithms, 2. Gröbner Bases, 3. Elimination Theory, and 4. The Algebra-Geometry Dictionary. As time allows, we will survey topics from other chapters.

Philosophy: I assume your *purpose* in the course is to learn about algebraic geometry. As such, I am not an adversary you have to battle for a grade, but your *advocate* in learning deep and fascinating mathematics. We are on a shared journey to learn and discover; forming a *community*. I will make mistakes (sometimes on purpose as a way to demonstrate how to navigate through them), and so will you. Mistakes are to be *cultivated*, as they are essential to learning. In fact, discovery often happens from "good mistakes". I encourage experimentation, collaboration, and freely asking questions (even so-called "dumb questions"). Please understand, as your advocate, our classroom and my office are always safe spaces for learning.

Homework: There will be regular HW assigned. You will turn in assigned problems (written in LaTeX) to **Gradescope**. We will generally try to have a "paperless" class.

Exams: *There will be no exams.*

Presentations: Students will give presentations on topics from our text.

Grading: Your grade for the course will be calculated based on the HW (70%), and Presentations (30%).

The grading scale will be: A: 90-100%; B: 80-89%; C: 70-79%; D: 60-69%; F: below 60% .

COVID: Students are required to follow the university's public health and safety precautions (https://www2.gmu.edu/safe-return-campus). This includes completing the Mason COVID Health Check daily (only students who receive a "green" notification are permitted in F2F courses) and wearing a facemask in all indoor settings (an appropriate facemask must cover your nose and mouth at all times).

Electronic Devices (such as laptops, cell phones, etc.)**:** Please be respectful of your peers and your instructor and do not engage in activities that are unrelated to class. Such disruptions show a lack of professionalism and may result *penalties.*

Disabilities: Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University.

All academic accommodations must be arranged through that office. It is the student's responsibility to get exam accommodation forms signed and turned in at least one week before the exams.

If you are seeking accommodations, please visit https://ds.gmu.edu/ for detailed information, or email: ods@gmu.edu.

Academic Integrity: It is expected that students adhere to the George Mason University Honor Code as it relates to integrity regarding coursework and grades. The Honor Code reads as follows:

To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the University Community have set forth this: Student members of the George Mason University community pledge not to cheat, plagiarize, steal and/or lie in matters related to academic work.

More information about the Honor Code, including definitions of cheating, lying, and plagiarism, can be found at the Office of Academic Integrity website at: https://oai.gmu.edu.

Diversity: In this course, we seek to create a learning environment that fosters respect for people across identities. We welcome and value individuals and their differences, including gender expression and identity, race, economic status, sex, sexuality, ethnicity, national origin, first language, religion, age and ability. We encourage all members of the learning environment to engage with the material personally, but to also be open to exploring and learning from experiences different than their own. See the following URL for more information:

https://stearnscenter.gmu.edu/knowledge-center/general-teaching-resources/mason-diversity-statement/

Privacy: Students must use their GMU email account to receive important University information, including messages related to this class. *I will not correspond to anyone in this course over email if they do not use their official GMU email.*