

Course Information

Course number and title: **MA 45401 Galois Theory Honors**

CRN: 16920

Meeting time: 1:30 pm - 2:45 pm TR MATH 215

Instructional modality: Face-to-Face

Course credit hours: 3

Course info: see **Brightspace**

Information About the Instructor

Professor: Ilia/Ilya Shkredov

Office Location: MATH 736

Phone number:

Email Address: ishkredo@purdue.edu

Office hours, times and location: Monday 4:30-6:00, Wednesday 4:30 pm - 6:00 pm. Or by appointment (e.g. send me an e-mail or a message in Brightspace to schedule a Zoom meeting)

Course Description

This course will give a thorough introduction to Galois theory. Galois theory is a fundamental tool in many areas of mathematics, including number theory and algebraic geometry. This course will increase students' mathematical maturity and prepare them for graduate school. Topics include finite extension fields and their symmetries, ruler and compass constructions, complex roots of unity, solvable groups, and the solvability of polynomial equations by arithmetic and radical operations. This course is intended for third- or fourth-year students who have taken MA 45000 (Algebra Honors) or MA 45300 (Elements of Algebra I).

Learning Resources, Technology, & Texts

Not needed. Companion texts:

[1] D. J. H. Garling, A Course in Galois Theory, Cambridge University Press, 1986.

[2] P. A. Grillet, Abstract Algebra, Graduate Texts in Mathematics vol. 242, Springer, 2007.

Learning Outcomes

After completing this course satisfactorily, students should expect to :

1. Acquire basic skills in an important theme of Galois theory;
2. Know about the connections of Galois theory and related disciplines, know about applications of Galois theory;
3. Acquire basic skills in working with fields extensions;
4. Acquire basic skills in working with finite fields, cyclotomic polynomials, ruler and compass constructions;
5. Gain experience applying Galois theory to the solvability of polynomial equations.

Course Logistics

- Methods of Evaluation: Participation in weekly discussions. Homeworks. Final exam.
- Midterms and final exam include at least one theoretical question.

Instructor's Email Availability and Policies

I will be available via email daily and try to respond as soon as possible (generally within 48) hours. When emailing me, please place the course number/section and the topic in the subject line of the email (*e.g.*, MA 45401). This will help me tremendously in locating and responding to your emails quickly. Please send emails from your official Purdue address.

Office Hours

Office hours, times and location: Monday 4:30-6:00, Wednesday 4:30 pm - 6:00 pm or by appointment.

Virtual Office Hours (by appointment) are a synchronous session (through WebEx -or ZOOM depending on the time/quality of the connection).

Ideally, if you think that your question and its possible answer could benefit other people in the class, the best time to ask it would be during the “regular class time discussion.”

Assignments and Points

Your learning will be assessed through a combination of **weekly homeworks, 2 midterms, and a final exam**. Weekly homework assignment file should be appended by your username, such as “assignment1-kim53.doc” and submitted via Brightspace. This will make it easier for me to manage assignment files and provide feedback to you. Details on these assignments and exams, including rubrics to guide evaluation will be posted on Brightspace. **The homeworks is worth 45%, midterms 15% + 15% and the final exam 25%.**

Missed or Late Work

Missed assignments may only be made up when you notify me ahead of time with an explanation and plan for completion. These requests will be accepted at my discretion. Asking for an extension does not guarantee it will be granted.

Grading Scale

Students who get at least 97% of the total points in this course are guaranteed an A+, 93% guarantees an A, 90% an A-, 87% a B+, 83% a B, 80% a B-, 77% a C+, 73% a C, 70% a C-, 67% a D+, 63% a D, and 60% a D-; for each of these grades, it's possible that at the end of the semester a somewhat lower percentage will be enough to get that grade.

Course Schedule

- **Homeworks:** approximately one task per week
- **First Midterm:** In class, **Thursday 6th February**
- **First Midterm:** In class, **Thursday 27th March**
- **Final exam:** In class

More TBA on the Brightspace

Attendance Policy

Students are highly encouraged to be present for every meeting of the class.

The University expects that students will attend classes for which they are registered. At times, however, either anticipated or unanticipated absences can occur. The student bears the responsibility of informing the instructor in a timely fashion, when possible. The instructor bears the responsibility of trying to accommodate the student either by excusing the student or allowing the student to make up work, when possible. The University expects both students and their instructors to approach problems with class attendance in a manner that is reasonable.

Academic Integrity

[Academic integrity](#) is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either [emailing](#) or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

The [Purdue Honor Pledge](#) "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue"

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognises and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Link to Purdue's [Nondiscrimination Policy Statement](#)

Accessibility

Purdue University strives to make learning experiences accessible to all participants. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone at 765-494-1247.

If you have been certified by the Disability Resource Center (DRC) as eligible for accommodations, you should contact your instructor to discuss your accommodations as soon as possible. Here are instructions for sending your Course Accessibility Letter to your instructor: <https://www.purdue.edu/drc/students/course-accessibility-letter.php>

Mental Health Statement

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [WellTrack](#). Sign in and find information and tools at your fingertips, available to you at any time.

If you need support and information about options and resources, please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc. sign up for free one-on-one virtual or in-person sessions with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at evans240@purdue.edu.

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second

floor of the Purdue University Student Health Center (PUSH) during business hours. A new web and app-based mental health [resource](#) is now available courtesy of Purdue Counseling and Psychological Services.

Basic Needs Security

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Emergency Preparedness

Some [emergency information and details here](#).

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website in Brightspace or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

Course Evaluation

During the last two weeks of the course, you will be provided with an opportunity to evaluate this course and your instructor. Purdue uses an online course evaluation system. You will receive an official email from evaluation administrators with a link to the online evaluation site. You will have up to two weeks to complete this evaluation. Your participation is an integral part of this course, and your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

Disclaimer

This syllabus is subject to change. You will be notified of any changes as far in advance as possible via an announcement on Brightspace. Monitor your Purdue email daily for updates.