POLICIES / SYLLABUS

Instructor

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Class Meeting
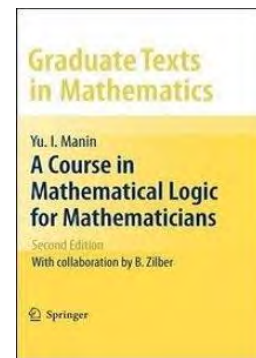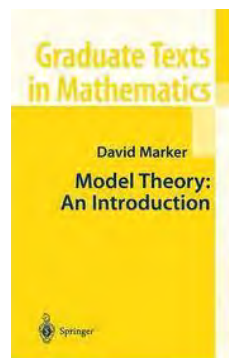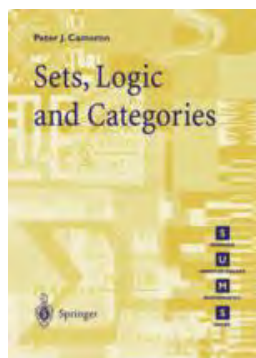
TR 11 am–12:15 pm, RH 247.

Office Hours

MWR 2:30–3:50 pm, RH 216. Subject to change; for latest information, see my schedule at https://ericmoorhouse.org/schedule.html. Also available by appointment. Please let me know if you prefer to meet by Zoom as I no longer open Zoom during office hours except by special request.

Textbook/Resources

I have listed *Sets, Logic, and Categories*, Peter J. Cameron, Springer, 1998 as the official textbook and I recommend you purchase and read this unless you have already completed a first course in mathematical logic, including first order logic. For those in the latter category who want something at a higher level, I will recommend in its place either *Model Theory: An Introduction*, David Marker, Springer, 2002; or *A Course in Mathematical Logic*, 2nd ed., Yuri Manin, 2010. I will strive to keep lectures self-contained; nevertheless I hope you will locate a copy of at least one of the two books I have listed, and start reading it. From time to time I will also provide handouts with course-related content.

Grading Scheme

I will assign grades (A, B, C, D, F, W) at the end of the semester according to the scale: A=exceptional,

Participation	50%
Homework	50%

B=very good, C=adequate, D=poor, F=fail, W=withdrawal. I always encourage students to consult me at any time during the semester with questions, including (but not restricted to) questions about your progress in the course. You may ask questions by email, at your own risk (remember that email is not secure); but questions asked in person typically receive more prompt and complete answers.

I also encourage students to present a topic during class for part of their grade. The terms of this can be negotiated directly with me provided you do so early in the course, so that I can be sure the topic is suitable and that you have suitable resources for preparing a presentation on the topic we have agreed upon. Please discuss this with me early in the course (before midsemester) if this is of interest to you.

Homework

Homework will be assigned periodically. It is fine for you to discuss the homework with other students. However, do not copy anyone else's work directly, and do not copy other sources. Copying will adversely affect your grade.

Topics Covered

We will give an overview of Cameron's book, which primarily concerns first-order logic, and the rudiments of set theory including the ZFC axioms. You should read this carefully if you are not familiar with it. Because the material is not well suited to line-by-line exposition in class, I will instead spend class time giving an overview of the material and providing examples of how mathematical logic and set theory arise in modern mathematics. Some of these examples should be eye-opening, and it is hoped that they will inspire you to keep reading through the drier portions of the text. Some of the topics we may include (not covered in Cameron's book) are

- Back and Forth Constructions
- Fräissé limits
- Ultraproduct constructions
- Emil Artin's solution to Hilbert's 17th problem.
- The MRDP Theorem (Matiyasevich, Robinson, Davis, Putnam) resolving Hilbert's 10th problem.
- Set theory beyond ZFC, including Suslin's problem.
- Measurable cardinals and other large cardinals. A striking application of Laver cardinals to finite mathematics will be described.
- Order indiscernibles (best described in Marker's book) and striking recent applications to finite and 'locally finite' geometry.

Participation

You are expected to attend class regularly and be prepared to participate. A portion of your grade will be based on the regularity of your presence in class, and on your involvement in class discussions.

Course Website

Please bookmark the site https://ericmoorhouse.org/courses/5590/ and visit it regularly for class updates and announcements, electronic copies of handouts, etc.

Appropriate Conduct

For issues of academic honesty/dishonesty, classroom deportment, etc., we refer to

- [UW Student Code of Conduct](#) (UW Dean of Students)
- [Students & Teachers Working Together](#) (UW College of Arts & Sciences)

Links to both documents appear on our course website.

Syllabus Changes: This syllabus is subject to change. Updates to this syllabus will appear electronically on the course website, and you will be alerted by email.