Howdy, msomers@ufl.edu

University of Florida

Jindrich Zapletal
Department of Mathematics

College *of* Liberal Arts *and* Sciences

- Home
- Resume
- Publications
- Logic seminar
- **Teaching Fall 2021: MAT 4930 and MHF 6306**

MAT 4930 and MHF 6306

Course: MAT 4930 section 0402, course number 24145; MHF 6306 section 3620, course number 16957

Meets: MWF 6th period, 12:50pm-1:40pm, LIT 423

Instructor: Jindrich Zapletal office hours MWF 5th, in LIT 456 and also on zoom The email address is zapletal@ufl.edu

Course prerequisites: The students should have attended a standard undergraduate set theory course equivalent to the UF course MHF 5107. If not, please talk to the instructor to find out if your background is suitable.

Course content: This is the first, set theory part of a one year graduate sequence in mathematical logic. The two parts of the sequence are quite independent of each other and can be taken in any order. The course is divided into four blocks, the dates are somewhat aspirational:

1. Axiomatization of set theory, transfinite recursion and induction, transitive models of set theory. This part mostly gathers theorems and facts of basic ZFC set theory that most students should be to some extent familiar with. Aug. 23—Sep. 3
2. Goedel's constructible universe. This is the model of set theory which Goedel found in the 1930's and used it to show that the Continuum Hypothesis cannot be disproved from the axioms of ZFC set theory. Goedel's proof is our main goal. If time permits, I will introduce variations of this model and also the HOD model. Sep. 8—Oct. 1
3. Cohen's method of forcing. This is the method that Cohen used in 1960's to show that the Continuum Hypothesis cannot be proved from the axioms of ZFC, and the axiom of choice cannot be proved from the axioms of ZF. I will introduce the basics of forcing, the forcing theorem, and prove the main two Cohen's results. Oct 4—Nov. 5
4. Descriptive set theory. This is the science of Polish spaces (topological spaces similar to the reals) and their definable subsets (such as Borel or analytic sets). My goal is to discuss basic constructions of Polish spaces, and then prove

Suslin's theorem: a subset of a Polish space is Borel if and only if both it and its complement are analytic sets. Nov. 8—Dec.8

Textbook, recommended reading: This depends on the block. Schindler: Set Theory, Springer Verlag 2014, ISBN 9783319067247 available in the UF library as an e-book under call number QA248.S319 2014 follows the outline of our course very closely, and it is a great recent book. There are other options, some of them more classical, as listed below.

1. An undergraduate treatment is provided in the book Set Theory and Foundations of Mathematics. Volume 1: Set Theory, which is coauthored by Doug Cenzer, Jean Larson, Chris Porter, and Jindrich Zapletal; it is available as an e-book in the UF library under call number QA248.C358 2020. A more condensed treatment is in Thomas Jech: Set Theory, Section I.1, which is available as an e-book under call number QA248.J42 2003eb. Many other options are perfectly fine.
2. Jech: Set Theory II.13 or Kunen: Set Theory, An introduction to Independence Proofs, Chapter VI call number QA248.K75
3. There are several equivalent treatments of forcing which on the surface may seem very different. I will avoid the Boolean-valued model approach of Jech, and use the more direct combinatorial approach of Kunen or Schindler.
4. I hope to motivate as many people as possible to look into the standard textbook, Kechris: Classical Descriptive Set Theory, UF library e-book under the call number QA248.K387 1995. This covers a lot of stuff we cannot possibly go into, but it is a classic, greatly superior to any other treatment of the subject.

Grading, attendance: Attendance will not be taken. There will be four equally weighted homework assignments, one per block. I do not want to commit to precise due dates at this point. The students will get a week to work on each, the due date of the last one will fall into the exam week. The homework assignments will consist of proofs. At the end, the letter grade will be calculated from the homework grades using the standard curve: A=93% and higher, A-=90-93%, B+=87%-90% and so on. There is no final exam. More information on UF grading policy may be found at: UF Graduate Catalog and Grades and Grading Policies

Administrative stuff:

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality

of instruction in this course by completing course evaluations online via GatorEvals. Click here for guidance on how to give feedback in a professional and respectful manner. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students here.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see the Notification to Students of FERPA Rights.

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: counseling.ufl.edu/cwc, and 392-1575; and the

University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or police.ufl.edu.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling.

Library Support, Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints Campus

On-Line Students Complaints