Foundations of Mathematics, MHF 4203/5207

Course: Foundations of Mathematics, MHF 4203 and MHF 5207, sections 3216 and 128D

Meeting time and place: LIT 0127, MWF 8th period

Instructor: Jindrich Zapletal

Office: 468 Little Hall, office hours MWF 6th period

Contact: zapletal@math.ufl.edu   , 352-392-0281×277

Textbook: The corresponding chapters of the notes   posted by the instructor. Good supplementary reading can be found in the first four chapters of Peter G. Hinman, Fundamentals of Mathematical Logic
, A K Peters 2005, ISBN 1-56881-262-0

Grading system: There will be four equally weighted take-home assignments (including a take-home final). Attendance will not be taken.

Contents of the course: The course is divided into four parts covered by the respective take-home assignments.

1.   First order logic. We will introduce the formal language of first order logic and formal proofs as defined by Hilbert and Ackermann. This constitutes the standard for formalization of modern mathematics.

2.   Model theory. We define structures corresponding to first order logic and prove Goedel's completeness theorem: every consistent theory in the first order logic describes some structure.

3.   Goedel's incompleteness theorem. We will introduce Peano arithmetic PA (a specific first order theory formalizing arithmetic on natural numbers and induction) and prove that there are statements in the language of PA that cannot be proved or disproved on the basis of axioms of PA. As a consequence, Hilbert's aim of complete axiomatization of mathematics is not attainable.

4.   Computability. We formalize the notion of a computable function and prove that several possible definitions (via Turing machines or recursion) in fact give the same class of functions.

Further administrative matters: Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx
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Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at https://evaluations.ufl.edu   . Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/
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Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

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 (http://www.dso.ufl.edu/sccr/process/student-conduct-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.

Updates: The slides from the second week presentations can be found here
The first midterm exam (due February 10) can be found here
The second midterm exam (due March 17) can be found here
The third midterm exam (due April 7) can be found here
The final (due April 28) can be found here