

Department of Mathematics  
**Math 3710**  
Introduction to Mathematical Logic  
Fall 2018  
TR 3:45–5:00pm  
Gelman 402

- **Professor**

Valentina Harizanov

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*Office Hours:* : Tu 5:15–6:45pm; Th 12:35–1:50pm

At other times by appointment.

- **Mathematics department**

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- **Description**

- Mathematical or symbolic logic as the study of reasoning using the exact methods of mathematics. Syntax and semantics. Precise formalization of deductive reasoning. Logical correctness of reasoning. Valid arguments.

- Formal languages. Propositional connectives and formulas. Conjunctive and disjunctive normal forms. Interpretation, truth, validity and soundness. Tautologies. Completeness theorem. Compactness theorem and its applications. Adequate sets of connectives. Applications to design of digital electronics.

- Quantifiers. First-order predicate logic. First-order definability. Valid formulas. Satisfiability and models. Prenex normal form. Deduction theorem. Consistency. Gödel completeness theorem. Compactness theorem. Undecidability results.

- **Required background**

Math 2971 or permission of instructor.

- **Textbook**

Derek Goldrei: *Propositional and Predicate Calculus: A Model of Argument*, Springer.

- **Learning Outcomes**

As a result of completing this course students should be able to:

1. Represent statements by formulas in a formal language;
2. Interpret terms and formulas in a mathematical structure;
3. Establish connections between syntax and semantics;
4. Prove consistency of sets of statements;
5. Apply compactness theorem to prove mathematical facts.

- **Grading**

Based on class participation (10%); homework assignments (50%), midterm exam (20%), take-home final exam (20%).

Midterm Exam: Tuesday, October 23, 2018, during class

For letter grades: 90% will be at least A-, 80% will be at least B-, 65% will be at least C-, and 50% will be at least D-.

- **Take-Home Assignment Policy**

Working in groups to discuss problems on the take-home assignments is not only permitted but is encouraged. However, the final submitted answers must be your own work, composed by you without copying from any source. You will also be asked to give in-class presentation of the solutions to selected problems in the assignments.

- **Attendance/Absence Policy**

Students are expected to attend all lectures, and are responsible for learning all material covered in lectures. If you must be away from class on a given day, please contact the instructor before the class and explain the need for your absence. In such a situation, your absence

can be excused. Work missed owing to excused absence will not count against a student's grade. (Still, students are responsible for learning the material that is covered, even if they cannot be in class.)

- **Work Outside Class**

More than 2/3 of the time you devote to this class should take place outside the classroom. Even the best students in the class should plan on spending an average of at least 5 hours a week on assignments and other studying. Some students may need to spend more time in order to master the material.

- **Blackboard**

Announcements and additional learning material or relevant information will be posted on blackboard: <https://blackboard.gwu.edu/>

Use your Net Id and password to access blackboard.

- **Academic Integrity Code**

Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information. For the remainder of the code, see

<https://studentconduct.gwu.edu/code-academic-integrity>

- **Support for Students Outside the Classroom**

*Academic Support Services:* <https://advising.columbian.gwu.edu/academic-support>

*Disability Student Services*

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: <https://disabilitysupport.gwu.edu/>

*Mental Health Services:* 202-994-5300

The University's Mental Health Services offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health

consultations, confidential assessment, counseling services (individual and small group), and referrals. For additional information see: [counselingcenter.gwu.edu/](http://counselingcenter.gwu.edu/)

- **University Policy on Religious Holidays:**

<http://students.gwu.edu/accommodations-religious-holidays>

Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance.

Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations.

- **Emergency Preparedness:** [www.gwu.edu/~gwalert](http://www.gwu.edu/~gwalert)