The Hebrew University of Jerusalem

Syllabus

MATHEMATICAL LOGIC (2) - 80424

Last update 24-02-2021

HU Credits: 3

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Mathematics

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof. Omer Ben Neria

Coordinator Email: omer.bn@math.huji.ac.il

Coordinator Office Hours: set an appointment

Teaching Staff:

Prof Omer Ben-Neria

Course/Module description:

In the beginning of the 20th century mathematicians tried to find a complete system of axioms for the whole of mathematics and in particular for number theory.

Godel showed that these efforts cannot succeed: Godel's incompleteness theorem says that in any reasonable system of axioms there is always a true statement which cannot be proved.
In the course we will review the incompleteness theorems and relevant parts of recursion theory. We will also learn about Peano Arithmetic.
In addition the course includes an introduction to model theory.

Course/Module aims:

See learning outcomes.

Learning outcomes - On successful completion of this module, students should be able to:

Better understanding of mathematical logic, the tools it provides (like compactness) and its limitations (the incompleteness theorem).

Attendance requirements(%):

0

Teaching arrangement and method of instruction: Lecture+exercise

Course/Module Content:

This is a list of some of the subjects that will be covered in the course:
Godel's incompleteness theorems on Peano arithmetic.
Tarski's truth theorem.
Recursion theory: recursive function, the recursion theorem, RE sets.
Model theory: ultraproducts, compactness, Lowenheim-Skolem theorems.
Models of Peano Arithmetic.

Required Reading:

none

Additional Reading Material:

R. Smullyan, Godel's Incompleteness Theorems

R. Kaye, Models of Peano Arithmetic

J.L. Bell and M. Machover, A Course in Mathematical Logic

J.R. Shoenfield, Mathematical Logic

H. Enderton, A Mathematical Introduction to Logic

Course/Module evaluation:

End of year written/oral examination 0 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 50 %
Assignments 50 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:

The grade will be based on students presenting solutions to exercises during the semester and a final assignment