# The Hebrew University of Jerusalem

## Syllabus

# MODEL THEORY (1) - 80616

*Last update 24-08-2023*

*HU Credits:* 3

*Degree/Cycle:* 2nd degree (Master)

*Responsible Department:* Mathematics

*Academic year:* 0

*Semester:* 1st Semester

*Teaching Languages:* English

*Campus:* E. Safra

*Course/Module Coordinator:* Yair Hayut

*Coordinator Email:* yair.hayut@mail.huji.ac.il

*Coordinator Office Hours:* meeting can be set by mail.

*Teaching Staff:*

*Prof Itay Kaplan*

*Course/Module description:*

*Model theory looks at mathematical structures from the standpoint of language; specific mathematical languages are suitable to different fields, reflecting the algebraic structure and notions of limit in it. This class a first introduction to the methods of model theory, taking up the story from Logic I.*

*Course/Module aims:*

*Achieving understanding of basic ideas of model theory. See moodle page.*

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

*Ability to prove and apply the theorems presented in the course.*

*Ability to apply correctly the mathematical methodology in the context of the course.*

*Acquiring the fundamentals as well as basic familiarity with the field which will assist in the understanding of advanced subjects.*

*Ability to understanding and explain the subjects taught in the course.*

*Attendance requirements(%):*

*0*

*Teaching arrangement and method of instruction: Lectures, homework problems.*

*Course/Module Content:*

*Languages and structures; compactness. Omitting types. Countable models of complete theories: homogeneous models, Ryll-Nardjewski. Saturated models. Applications to definability theorems (Robinson, Beth, and more). Simple applications to algebra. Definable and algebraic closure. Indiscernibles. Morley's theorem.*

*Required Reading:*
*Tent, Ziegler: A course in Model Theory.*

*An alternative: the first three chapters of Change and Keisler, as well as 4.1, 7.1, 7.2.*

*Chang, C. C.; Keisler, H. J. Model theory. Third edition. Studies in Logic and the Foundations of Mathematics, 73. North-Holland Publishing Co., Amsterdam, 1990. xvi+650 pp. ISBN: 0-444-88054-2*

*Additional Reading Material:*
*Poizat, Bruno A course in model theory. An introduction to contemporary mathematical logic. Translated from the French by Moses Klein and revised by the author. Universitext. Springer-Verlag, New York, 2000. xxxii+443 .pp*

*Grading Scheme:*
*Essay / Project / Final Assignment / Home Exam / Referat 50 %*
*Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 50 %*

*Additional information:*
*Other or additional topics may be studied*