

## *The Hebrew University of Jerusalem*

### *Syllabus*

## **FUNDAMENTAL CONCEPTS IN ALGEBRAIC TOPOLOGY - 80607**

*Last update 20-04-2015*

*HU Credits:* 6

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

*Responsible Department:* Mathematics

*Academic year:* 1

*Semester:* 2nd Semester

*Teaching Languages:* Hebrew

*Campus:* E. Safra

*Course/Module Coordinator:* Prof. Yakov Varshavsky

*Coordinator Email:* [sela@math.huji.ac.il](mailto:sela@math.huji.ac.il)

*Coordinator Office Hours:* By appointment

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Teaching Staff:

Prof Yakov Varshavsky

Yair Hayut

Course/Module description:

*Basic concepts in Algebraic Topology.*

*Prerequisites: Algebraic Structures 1, Intro. to Topology, Advanced Infinitesimal Calculus II*

Course/Module aims:

*Introduction to Algebraic Topology.*

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

*Basic concepts in Algebraic Topology.*

*Ability to construct and use of Homotopy and Homology.*

*Proving the fixed point theorems and other applications of homology and homotopy.*

*Ability to prove fundamental theorems in Algebraic Topology.*

Attendance requirements(%):

0

*Teaching arrangement and method of instruction: Lecture + exercise*

Course/Module Content:

*A. Homotopy, the Fundamental Group, Cover Spaces.*

*B. Most of the course will deal with the construction of functors from the Homotopy category into the more accessible categories of Abelian Groups.*

*C. Singular Homology, conservation under Homotopy, short and long Exact Sequences, the Trimming Theorem.*

*D. Cohomology and Products.*

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*E. Applications in Euclidean Spaces and Spheres, the Duality Theorems.*

*Required Reading:*

*None*

*Additional Reading Material:*

*We will mainly use the book of*

*Hatcher, "Algebraic Topology"*

*Course/Module evaluation:*

*End of year written/oral examination 80 %*

*Presentation 0 %*

*Participation in Tutorials 0 %*

*Project work 0 %*

*Assignments 20 %*

*Reports 0 %*

*Research project 0 %*

*Quizzes 0 %*

*Other 0 %*

*Additional information:*

*none*