THE HEBREW UNIVERSITY OF JERUSALEM

Syllabus

FUNDAMENTAL CONCEPTS IN ALGEBRAIC TOPOLOGY - 80607

Last update 21-09-2022

HU Credits: 6

Responsible Department: Mathematics

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof. Jake Solomon

Coordinator Email: jake@math.huji.ac.il

Coordinator Office Hours: By appointment

Teaching Staff:
Prof Tomer Schlank,
Mr. Shai Keidar

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(%):
  80

Teaching arrangement and method of instruction: Lecture + exercise

Course/Module Content:
  A. Homotopy, the Fundamental Group, Cover Spaces, van Kampen theorem.

B. 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, Mayer-Vietoris theorem.

D. Cohomology and Products.

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

F. Additional or different topics may be covered.

Required Reading:
 None

 Additional Reading Material:
  We will mainly use the book of

Hatcher, "Algebraic Topology"

 Grading Scheme:

Additional information:
  Take home exam.