האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

DISCRETE MATHEMATICS - 80181

Last update 29-10-2019

HU Credits: *5*

Degree/Cycle: *1st degree (Bachelor)*

Responsible Department: *Mathematics*

Academic year: *0*

Semester: *1st and/or 2nd Semester*

Teaching Languages: *Hebrew*

Campus: *E. Safra*

Course/Module Coordinator: *Dr. A Gurevich*

Coordinator Email: *gurevich@math.huji.ac.il*

Coordinator Office Hours: *Tue, 13-14*

Teaching Staff:

Dr. Orit Raz
Dr. Boris Begun
Mr.
Mr. Moshe White
Ms. Zilberman Chaya
Ms. Noy Sofer
Dr. Alex Gourevich
Mr. Uri Brezner
Mr. Michael Simkin

Course/Module description:

1. Logic – Boolean operations, truth tables, propositional calculus and semantic
2. Set theory – operations on sets, Cartesian product, functions
3. Relations - equivalence and order relations, partially ordered sets
4. Counting problems – counting with and without order importance, set partitions
5. Identities - the binomial and multinomial formulas, combinatorial and algebraic proofs
6. Inclusion-exclusion principal – enumeration surjective maps, enumeration permutations without fixed point, Euler's function
7. Reflection method - Catalan numbers
8. Pigeonhole principle – Erdos-Szekeres theorem
9. Induction and recursion – proofs by complete induction, solving of combinatorial problems with the aid of recursion, Fibonacci numbers, solving recurrence relations
10. Limiting behavior – big O and Theta notations, estimation of growth rates
11. Graphs – paths, connectivity, cycles, trees, bipartite graphs, Eulerian trails and cycles, Hamiltonian trails and cycles, matching, the marriage theorem, colored graphs, Ramsey theory

Course/Module aims:
Providing basic notions of Discrete Math and developing the ability to solve problems.

Learning outcomes - On successful completion of this module, students should be able to:
solve elementary problems in set theory, combinatorics, and graph theory.

Attendance requirements(%):
none

Teaching arrangement and method of instruction: Lecture + exercise

Course/Module Content:

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Required Reading:
none

Additional Reading Material:
Nati Liniel, Michal Parnas,
Discrete Mathematics (Hebrew)

Course/Module evaluation:
End of year written/oral examination 90 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 10 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:

none