



The Hebrew University of Jerusalem

Syllabus

New perspectives on teaching mathematics - 34324

Last update 13-10-2024

HU Credits: 2

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Teaching Training - Diploma

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Dr. Alik Palatnik

Coordinator Email: Alik.Palatnik@mail.huji.ac.il

Coordinator Office Hours: Thursday 09:00-10:00

Teaching Staff:

Dr. alik palatnik

Course/Module description:

How to develop in the students a perception of mathematics as a human activity, as a system connected and anchored in reality and not an arbitrary collection of rules?

How do you make room for innovation in teaching traditional topics?

How are the pedagogical plans implemented in the reality of a classroom?

The course gives students the opportunity to deal with these issues, to plan, implement and reflect on a teaching unit of mathematics.

Course/Module aims:

The course uncovers novel didactic techniques promoting learning and teaching in the mathematics classroom

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

Students will become familiar with and experience various teaching and learning methods for mathematical subjects in various contexts.

Students will use different approaches to design instructional units (including lesson plans and lesson plays)

Students will solve typical problems in various subjects, emphasizing possible ways of teaching.

Students will be exposed to learning processes of mathematical concepts according to the curriculum continuum.

Students will become familiar with the secondary school curriculum and a variety of textbooks.

Attendance requirements(%):

90

Teaching arrangement and method of instruction: Discussion, lecture, practice, PBL.

Course/Module Content:

Teaching Sequence: Elementary-Middle-High School-and Now What? Principles of Curriculum Design: Spiral, Connectivity, Coherence. Acquaintance with Ministry of Education Guidelines.

Acquaintance with mathematical terms and concepts that appear in the curriculum.

High School Distinction Program and New High School Math Program

Unique groupings and programs for end students.

Mathematical topics in the realm of (1) Number and Quantity; (2) Change and Relationships; (3) Uncertainty and Data and (4) Space and Shape.

Problem solving and problem posing.

Mathematical Literacy

Technology use: NetLogo, DESMOS, Geogebra, Excel, Games, KAHOOT.

Mathematics Teacher Pedagogical Content Knowledge Structure (PCK).

Assessment methods.

Teacher-researcher

Students' presentations: Problem-solving instruction (peer assessment and teaching experience)

Lesson planning: lesson plan, lesson script, building the maneuvering space.

Required Reading:

Abrahamson, D., Nathan, M. J., Williams-Pierce, C., Walkington, C., Ottmar, E. R., Soto, H., & Alibali, M. W. (2020, August). The future of embodied design for mathematics teaching and learning. In *Frontiers in Education* (Vol. 5, p. 147). Frontiers.

Arcavi, A. (1994). Symbol sense: Informal sense making in formal mathematics. *For the Learning of Mathematics*, 14 (3), 24-35.

De Lima, R. N., & Tall, D. (2008). Procedural embodiment and magic in linear equations. *Educational Studies in Mathematics*, 67(1), 3-18.

Zazkis, R., Liljedahl, P., & Sinclair, N. (2009). Lesson plays: Planning teaching versus teaching planning. *For the Learning of Mathematics*, 29(1), 40-47.

Hill, H., Ball, D. L., & Schilling, S. (2008). Unpacking "pedagogical content knowledge": Conceptualizing and measuring teachers' topic-specific knowledge of students. *Journal for Research in Mathematics Education*, 39(4), 372-400.

Lockhart, P. (2009). *A mathematician's lament: How school cheats us out of our most fascinating and imaginative art form*. New York, NY: Belevue Literary Press.

Palatnik, A., & Koichu, B. (2015). Exploring insight: Focus on shifts of attention. *For the Learning of Mathematics*, 35(2), 9-14.

Additional Reading Material:

Mason, J., Burton, L., & Stacey, K. (2010). *Thinking mathematically*. Harlow, England: Pearson.

Pólya, G., (1954). *Induction and analogy in mathematics*. Princeton, NJ: Princeton University Press. 48-54.

Grading Scheme:

Essay / Project / Final Assignment / Home Exam / Referat 70 %

Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 10 %

Presentation / Poster Presentation / Lecture 20 %

Additional information: