



## *Syllabus*

# **FUNDAMENTAL CONCEPTS IN SPECTRAL ANALYSIS - 80601**

*Last update 15-05-2024*

*HU Credits: 6*

*Responsible Department: Mathematics*

*Academic year: 0*

*Semester: 2nd Semester*

*Teaching Languages: Hebrew*

*Campus: E. Safra*

*Course/Module Coordinator: Yoram Last*

*Coordinator Email: [ylast\\_at\\_math.huji.ac.il](mailto:ylast_at_math.huji.ac.il)*

*Coordinator Office Hours:*

*Teaching Staff:*

*Prof Yoram Last,  
Mr. Leder Roe*

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Course/Module description:

*Banach algebras (Basics, ideals, spectrum),  $C^*$  algebras (Basics, positive elements, states and representations, the GNS construction and Gelfand-Neumark theorem), von Neumann algebras, introduction to spectral theory of self-adjoint operators on Hilbert spaces.*

*Other or additional topics may also be studied.*

Course/Module aims:

*See learning outcomes*

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 understand and explain the subjects taught in the course.*

Attendance requirements(%):

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

Course/Module Content:

*Banach algebras (Basics, ideals, spectrum),  $C^*$  algebras (Basics, positive elements, states and representations, the GNS construction and Gelfand-Neumark theorem), von Neumann algebras, introduction to spectral theory of self-adjoint operators on Hilbert spaces.*

*Other or additional topics may also be studied.*

Required Reading:

*none*

Additional Reading Material:

*R.V. Kadison & J.R. Ringrose, Fundamentals of the Theory of Operator Algebras.*

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*Volume I: Elementary Theory, Academic Press 1983*

*M. Reed & B. Simon, Methods of Modern Mathematical Physics. I: Functional Analysis (Revised and Enlarged Edition), Academic Press 1980*

*Grading Scheme:*

*Written / Oral / Practical Exam 90 %*

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

*Additional information:*

*If the exercise grade will be higher than the exam grade, the exercise grade will be 20% of the final grade and the exam grade will be 80% of the final grade.*