



This is the web page for course MAT6932 section 02HE (16911). We meet at LIT 223, (**change:** we now meet in LIT423) MWF 7th period.

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Polish spaces. Weeks of 8/24—9/27. Week 1. Topological and Polish spaces. Review of topology and geometry, examples of topological structures. Week 2. Operations on Polish spaces. Products, spaces of compact sets, of continuous functions, of probability measures. Week 3-4. Universal objects in the category of Polish spaces. Cantor space, Baire space, Hilbert cube, Urysohn space. Week 5. Polish groups. Metrizability theorem, examples, continuous actions.

Borel hierarchy, analytic and coanalytic sets. Weeks of 9/27—11/1. Week 6. Borel hierarchy and analytic sets. Definition of Borel hierarchy and analytic sets. Lebesgue's mistake. Week 7. Separation and uniformization theorems. Suslin's fix to Lebesgue's mistake and related issues. Week 8. Coanalytic ranks. Definition and basic examples. Weeks 9 and 10. Examples of analytic and coanalytic sets in mathematical analysis, topology, and algebra.

Dichotomy theorems. Weeks of 11/1—12/9. Week 11. Infinite games and Borel determinacy. Week 12. Examples of determined games and their uses. Week 13. Graph dichotomies. The Borel chromatic number of graphs and the simplest Borel graph with uncountable chromatic number. Week 14 and 15. Applications of graph dichotomies. Novikov's uniformization theorem and many others.

After each of the three blocks, I will assign a take home exam. The three take home exams will be equally weighted.

The textbook for weeks 1-12 is Alexander Kechris: Classical Descriptive Set Theory, Graduate Texts in Mathematics 156, Springer-Verlag 1991, ISBN 0-387-94374-9, catalog number QA248.K387. The contents of weeks 13-16 is more recent, it simplifies many proofs in Kechris greatly, and there will be a separate reference for that here.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

