

School of Mathematics

Course 415 — Topics in Analysis (Operator Theory)
(JS & SS Mathematics)

2003-04

Lecturer: Dr. R. Hügli

Requirements/prerequisites: 321

Duration: 21 weeks

Number of lectures per week: 3 including tutorials

Assessment: No continuous assessment.

End-of-year Examination: 3-hour end of year examination.

Description: The syllabus may be adjusted in the light of time constraints.

- **Hilbert spaces:** Orthonormal bases, projections, self-adjoint and normal operators.
- **Banach spaces:** Bounded linear maps, linear functionals, duality, the adjoint of an operator.
- **Banach algebras:** Ideals, spectrum, functional calculus, spectral theory.
- **C^* -algebras:** Functional calculus, positive elements, GNS-representation.
- **von Neumann algebras:** Topologies on $\mathcal{B}(H)$ (weak and strong operator topologies), Abelian von Neumann algebras, projections, traces.

Textbooks: The following will be used as a basis for most of the topics.

John B. Conway, *A Course in Functional Analysis*. Second Edition. Graduate Texts in Mathematics Volume 96, Springer-Verlag (1990).

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