

Math 5213 Course Outline

Winter 2025

Instructor: A.J. Dean, **email:** andrew.j.dean@lakeheadu.ca

Office hours: Mondays and Wednesdays 12:30pm to 1:30pm. RB 2009.

Primary References:

Gerard J. Murphy, *C^* -Algebras and Operator Theory*, Academic Press, San Diego U.S.A. 1990.

M. Rordam, F. Larsen, and N. J. Lausten, *An introduction to K -theory for C^* -Algebras*, London Mathematical Society Student Texts **49**, Cambridge University Press, Cambridge U.K. 2000.

Additional References:

B. Blackadar, *K -Theory for Operator Algebras, 2nd ed*, Mathematical Sciences Research Institute Publications **5**, Cambridge University Press, Cambridge U.K. 1998 (1st ed 1986).

Peter A. Fillmore, *A Users Guide to Operator Algebras*, Canadian Mathematical Society Series of Monographs and Advanced Texts, John Wiley and Sons, New York, U.S.A. 1996.

Kenneth R. Davidson, *C^* -Algebras by Example*, Fields Institute Monographs, American Mathematical Society, Providence, Rhode Island, U.S.A. 1991.

All of these books are available through the LU Library. You do not need to buy any course materials for this class.

Learner Outcomes: The successful student of this course will: be able to understand and use the spectral theory of operators on Hilbert space and in general C^* -algebras; be familiar with the main results on ideals and positive functionals, and representations of C^* -algebras; be proficient in computations and proofs involving unitaries and projections; understand the various pictures of the K_0 group and the K_1 group, and be able to compute them in concrete examples; be able to compute the order on K_0 groups; be proficient in computations with inductive limits, and understand the continuity of K -groups; understand the classification of AF algebras via K -theory, and be familiar with Bott periodicity and the six term exact sequence of K -theory.

Marking Scheme: Grades will be based on weekly assignments. There will be 10 of these. They will be weighted equally.

Drop Date: The final date to withdraw from this course without academic penalty is Friday March 7.

Academic Dishonesty: All cases of academic dishonesty will be dealt with according to the university's Academic Integrity Code.

Accommodations: Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. if you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please visit: <http://studentaccessibility.lakeheadu.ca>