

2026 Applied Algebra Qualifying Exam content

202A: Finite-dimensional Hilbert spaces, dual space, linear transformations, operator norm, Hilbert-Schmidt-Frobenius scalar product, singular value decomposition, polar decomposition, Moore-Penrose pseudo inverse, low rank approximation, normal and selfadjoint operators, eigenvalues and spectral theory.

202B: Finite-dimensional algebras, subalgebras and ideals, states and traces, convolution algebras of finite groups, discrete Fourier transform, representations of finite groups, character theory, discrete Peter-Weyl theorem.

202C: Representation theory of symmetric groups, multilinear algebra, polynomial rings, polynomial ideals, affine and projective varieties.