Department/Academic Unit: Mathematics and Engineering Degree Program: PhD

Degree Level Expectations, Learning Outcomes, Indicators of Achievement and the Program Requirements that Support the Learning Outcomes

Expectations (general descriptors from OCAV)	**Learning Outcomes** (program specific)** This degree is awarded to students who demonstrate…	**Indicators of Achievement** As evidenced by…	**Relevant Courses and academic requirements** (requirements that contribute to the achievement of learning outcomes and degree expectations)
Depth and breadth of knowledge	Learning outcome: Advanced graduate-level expertise in at least two subject areas (chosen from Analysis, Algebra, Probability and Statistics, and Geometry and Topology) and basic knowledge in a variety of other subject areas.	Indicators: (1) Performance in two or more core graduate-level courses (for advanced knowledge) and performance in introductory level graduate courses (for basic knowledge). (2) Demonstration of depth and breadth of knowledge in oral presentations forming part of the degree requirements.	Advanced knowledge: MATH 844, 891, 892, 893, 894, 895, 896 Basic knowledge: MATH 801, 802, 805, 806, 812, 813, 818, 825, 827, 830, 832, 834, 836, 837, 873, 886, 952, 953, 955, 962, 963, 965 Breadth of knowledge: Comprehensive exam, Thesis defence
Research and scholarship	Learning outcomes: (1) An ability to create new mathematical and/or statistical research. This includes being able to independently come up with ideas for research, and carry through an independent investigation of these. (2) An ability to identify open problems in a research area where progress is possible and important.	Indicator: Report writing and presentations, either as a part of explicit research activity, a course, or a seminar.	Comprehensive exam, Thesis defence
Application of Knowledge	Learning outcome: The ability to assimilate mathematical and/or statistical knowledge beyond the mere repetition of knowledge acquired in courses or preliminary	Indicator: Research activity, monitored by annual progress reports, culminating in the thesis defence.	MATH/STAT 999, Thesis defence