Department/Academic Unit: Graduate Program in Mechanical & Materials Engineering Degree Program: PhD

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

Expectations	Learning Outcomes	Indicators of Achievement	Relevant Courses and academic requirements	Transferable Skills
Depth and breadth of knowledge	A thorough understanding of a substantial body of knowledge that is at the forefront of Mechanical and/or Materials Engineering. The ability to integrate and apply knowledge and skills of inquiry to courses taken within and outside Mechanical & Materials Engineering (if applicable to their research area in Mechanical & Materials Engineering). The ability to integrate the knowledge and skills acquired in other disciplines into their course work and research in Mechanical & Materials Engineering.	The development of an in-depth knowledge of current research, state-of-the-art, and best practices in Mechanical & Materials Engineering. Integration and application of knowledge and skills of inquiry to courses taken within and outside Mechanical & Materials Engineering (if applicable to their research area in Mechanical & Materials Engineering). Integration of knowledge and skills acquired in other disciplines into their course work and research in Mechanical & Materials Engineering	Successful completion of PhD Comprehensive Examination (Part A: Knowledge of the Discipline; Part B: Thesis Proposal). Successful completion of course work requirement (4 graduate level courses). Successful completion and defense of research-based thesis.	Ability to apply acquired knowledge to perform research on fundamental scientific problems in a research-intensive company or in an academic position
Research and scholarship	The ability to conceptualize, design and implement research for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the research design or methodology in the light of unforeseen problems The ability to make informed judgments on complex issues in specialist fields, sometimes requiring new methods; and The ability to produce original research, or other advanced scholarship, of a quality to satisfy peer review and to merit	Enrolling in, and fulfilling the requirements of, courses which focus on methods of inquiry in Mechanical & Materials Engineering or topics related to their research area in Mechanical & Materials Engineering. Using their chosen methodology to plan and conduct their own original research in Mechanical & Materials Engineering.	Successful completion of PhD Comprehensive Examination (Part B: Thesis Proposal). Successful completion of course work requirement (4 graduate level courses). Successful completion and defense of research-based thesis.	Ability to use skills in a research intensive industry or academic position. Ability to carry out experiments or computation in common mechanical engineering fields and related fields.

	publication.			
Application of Knowledge	The capacity to: Undertake pure and/or applied research at an advanced level; and Contribute to the development of academic or professional skills, techniques, tools, practices, ideas, theories, approaches, and/or materials.	The investigation of inquiry pertaining to their interests in the area of Mechanical & Materials Engineering, and integration of this thread of inquiry throughout their course work and research. Plan and conduct original research in Mechanical & Materials Engineering.	Successful completion of PhD Comprehensive Examination (Part B: Thesis Proposal). Successful completion of course work requirement (4 graduate level courses). Successful completion and defense of research-based thesis.	Ability to apply knowledge in a research intensive industrial or academic position.
Professional capacity/autonomy	The qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex situations; The intellectual independence to be academically and professionally engaged and current; The ethical behaviour consistent with academic integrity and the use of appropriate guidelines and procedures for responsible conduct of research; and The ability to evaluate the broader implications of	An advanced and integrated conceptual understanding of the relationship between theory, practice, and reflection in Mechanical & Materials Engineering. The engagement in the analysis and dissemination of Mechanical & Materials related research. The demonstration of academic integrity in all scholarly activities. A demonstration of their ability to manage their own learning.	Creation of a roster of courses (4 graduate level courses) that fulfills their own personal goals for professional development with the assistance of their supervisor(s). Responsibility taken for the creation of their course work portfolio and the execution of their scholarly activities related to the conduct and dissemination of their research. Successful completion of graduate seminar requirement (MECH 997).	Ability and commitment to adhere to the professional engineer's code of conduct. Ability to work autonomously on complex scientific problems. Ability to lead a research group including a range of scientific competencies, including technical staff, engineers or graduate students.
Communication Skills	The ability to communicate complex and/or ambiguous ideas, issues and conclusions clearly and effectively.	A demonstration of communication skills through written projects and oral presentations in courses, seminars and research dissemination activities.	Successful completion of PhD Comprehensive Examination (Part A: Knowledge of the Discipline; Part B: Thesis Proposal). Successful completion of course work requirement (4 graduate level courses). Successful completion of graduate seminar requirement (MECH 997). Successful completion and defense of	Ability to explain complex concepts to research groups or graduate students. Ability to write technical papers and reports. Ability to produce and give concise, clear presentations at conferences.

			research-based thesis.	
Awareness of limits of knowledge	An appreciation of the limitations of one's own work and discipline, of the complexity of knowledge and of the potential contributions of other interpretations, methods and disciplines.	Comprehensive understanding of the limitations of research and the boundaries of present-day understanding in their specific area of research in Mechanical & Materials Engineering. The demonstration of the ability to evaluate the level of uncertainty in their research and the significance of error analysis.	Successful completion of course work requirement (4 graduate level courses). Successful completion and defense of research-based thesis.	Ability to recognize the limitations of computational models and state-of-the-art research equipment.