

Department/Academic Unit: Department of Biomedical & Molecular Sciences (DBMS): Master of Science (MSc.)

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

Degree Level Expectations (General descriptors from OCAV)	Learning Outcomes (program specific)** This degree is awarded to students who demonstrate:	Relevant Courses, Academic Requirement (requirements that contribute to the achievement of learning outcomes and degree expectations)	Indicators of Achievement As evidenced by...	Transferable Skills
<i>Depth and breadth of knowledge</i>	Graduating MSc students will demonstrate a sound command of knowledge in the area of biomedical and molecular sciences which will support the student's future academic activities or professional practice within government, private or civil society sectors (e.g. biotechnology companies, Health Canada regulatory affairs, clinical trials). Graduating students will also demonstrate a critical awareness of the current issues in biomedical and molecular sciences.	The Biomedical and Molecular Sciences MSc requires the completion of 12 units at the graduate level (at the minimum). BMED 860*, BMED 897* or equivalent (i.e. other seminar courses) and one additional unit from the Methods Modules are mandatory. Additional required units are specified by some of the Field Specialization (see below). Specific Field Course Requirements: <u>F1: Biochemistry and Cell Biology:</u> MSc Students in this field must complete 6 credit units from: BCHM 820*, BCHM 822*, or BCHM 823*. <u>F2: Experimental Medicine:</u> MSc students in this field can choose from any of the courses listed in Table 1 to complete the remaining required 6 units of coursework. <u>F3: Microbes, Immunity, and Inflammation:</u> MSc students in this field can choose from any of the courses listed in Table 1 to complete the remaining required 6 units of coursework.	Successful completion of course requirements. Positive feedback from supervisor and advisory committee on progress. Demonstrated depth of knowledge in biomedical and molecular sciences as evidenced by performance in required seminars, including ability to field questions related to biomedical and molecular sciences and a defensible well-written MSc thesis.	Strong understanding of the field of biomedical and molecular sciences.

		<p><u>F4: Reproduction and Developmental Sciences:</u> MSc students in this field can choose from courses covering reproduction and development, or if appropriate other courses listed in Table 1 to complete the remaining required 6 credit units of coursework.</p> <p><u>F5: Therapeutics, Drug Development, and Human Toxicology:</u> MSc Students in this field must complete 3 additional credit units from available Method Module offerings. In addition, students must complete three units from one of PHAR 810*, PHAR 811*, PHAR815*, PHAR 853*, or PHAR 854*; the specific course will be determined in consultation with the supervisor. In cases where students do not have the necessary background in core pharmacology, PHAR 840* and PHAR 850* may also be required.</p> <p>BMED 860* - (Fundamentals of Academic Research and Research Proposal) This mandatory course will introduce all graduate students to topics such as academic integrity, ethics in research, laboratory safety, proper record keeping, and use of library resources. Additionally, students will write a thesis proposal that includes a review of the related literature. The thesis proposal prepared by students requires that they start to review the literature and design experiments upon entry into the program. Similarly, the proposal is read by their committee members, which streamlines the feedback process and puts students in contact with a diversity of expertise as quickly as</p>		
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		<p>possible.</p> <p>BMED 897* – (Biomedical and Molecular Sciences Seminar Program) or equivalent seminar course. Students are required to attend weekly seminars and present their research in seminar format to a broad yet knowledgeable audience. Presenting their ideas and research in formal seminars not only provides an opportunity for additional feedback, but allows faculty, particularly supervisory committee members, to track student progress.</p> <p>ANAT, BCHM, MICR, PHAR and PHGY 899 - Master's Thesis Research (will be revised to BMED 899 - Master's Thesis Research).</p> <p>New modules for Interdisciplinary Methods are being developed. The goal of these modules is to familiarize graduate students with the principles and practice of cutting edge technologies used in biomedical and molecular sciences research.</p> <p>Required annually advisory committee meetings.</p>		
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<p><i>Research and scholarship</i></p>	<p>Graduating MSc students will have a firm understanding of current methods in biomedical and molecular sciences and the ability to utilize them to test a specific novel research hypothesis. Graduating students will have an understanding of the current literature so as to make informed conclusions on the interpretation of their research results. These results should be published or publishable in peer-reviewed journals.</p>	<p>BMED 860* - (Fundamentals of Academic Research and Research Proposal) BMED 897* – (Biomedical and Molecular Sciences Seminar Program) or equivalent seminar course. Additional course work requirements. MSc thesis research and defence.</p>	<p>Positive feedback from supervisor and student advisory committee on progress following required annual committee meetings. Demonstrated ability to field questions related to their research methods, rationale and conclusions during required seminars, including ability to defend their MSc thesis.</p>	<ul style="list-style-type: none"> -Innovation -Time management -Ability to plan -Work independently -Accept responsibility -Solve problems -Detail-oriented -Follow instruction -Safety conscious
<p><i>Application of knowledge</i></p>	<p>Graduating MSc students will have the ability to make informed judgments on complex issues in the area of biomedical and molecular sciences. Through the application of knowledge, graduates will demonstrate competence in the research process by using available current literature to guide and critically analyze a novel research hypothesis.</p>	<p>Required course work, including required research proposal. Committee meetings. MSc thesis research and defence</p>	<p>Successful performance in courses. Appropriately designed experiments resulting in presentation/publication of their research results. Successful performance during MSc oral defense.</p>	<ul style="list-style-type: none"> -Research-oriented -Critical thinking -Creative -Solve problems -Use complex equipment -Logical
<p><i>Communication skills</i></p>	<p>Graduating MSc students will have the ability to clearly articulate their research findings, their ideas, and their opinions both orally and in written format to colleagues as well as non-professionals.</p>	<p>Required student presentations for both BMED 897* (or equivalent seminar course) as well as other courses involving oral discussion of scientific topics and/or the peer reviewed literature. MSc thesis research and defence.</p>	<p>Positive feedback from supervisor and advisory committee on quality of required coursework presentations. Successful presentation of research progress in seminars and potentially publications. Demonstrated ability to</p>	<ul style="list-style-type: none"> -Written communication -Articulate -Public speaking -Computer skills -Ability to edit

			<p>communicate appropriately in their capacity as a teaching assistant to undergraduate students.</p> <p>Successful performance during oral MSc defense.</p>	
<i>Autonomy and professional capacity</i>	<p>Graduating MSc students will possess the qualities and transferable skills necessary for employment training, including the self-confidence to take initiatives and responsibilities during decision-making situations. Graduating students will also possess the intellectual independence to actively engage in continuing professional development; the ethical behaviour consistent with academic integrity and the use of appropriate guidelines and procedures for responsible conduct of research. Students will also have the ability to appreciate the broader implications of applying knowledge to new contexts.</p>	<p>Mentoring by supervisor, other faculty members, particularly advisory committee members, and postdoctoral and/or student colleagues.</p> <p>Although not required we will encourage students to participate in "Expanding Horizons" and serve as student representatives on various committees.</p>	<p>Successful research project design and management.</p> <p>Successful presentation of research results and interpretation.</p> <p>Appropriate supervision of undergraduate 499 and BCHM project students.</p>	<ul style="list-style-type: none"> -Accept responsibility -Self confidence -Decisive -Active engagement -Self-motivated
<i>Awareness of Limits of knowledge</i>	<p>Graduating MSc students will demonstrate an appreciation for the limitations of their research methods and potential biases of their interpretations of results.</p>	<p>Seminar presentation and mentoring by thesis supervisor, colleagues, and other faculty members.</p> <p>MSc thesis research and defence.</p>	<p>Seminar presentation and mentoring by thesis supervisor, colleagues and other faculty members.</p>	<ul style="list-style-type: none"> -Desire to learn and improve -Understand the big picture

* Articulate degree level expectations that are unique to the degree program. For programs that are also part of a collaborative program, specific DLEs must be added.

** General learning outcomes associated with Master's and doctoral degree level expectations can be found on the attached pages. Please use these as guidelines; programs should define their own learning outcomes.

Resources on Degree Level Expectations and Learning Outcomes can be found at: <http://www.queensu.ca/sgs/faculty-staff/quality-assurance> or speak with your SGS Associate Dean (Kim McAuley: mcauleyk@queensu.ca; Sandra den Otter: denotter@queensu.ca)