

## Certificate in Biomedical Research

---

### [Faculty of Medicine and Dentistry - Programs](#)

The Certificate in Biomedical Research is offered by the Departments of Biochemistry, Cell Biology, Pharmacology, and Physiology. Students who pursue the certificate will be engaged in world-class biomedical research programs and will acquire a broad range of research skills through substantive laboratory course and independent research project experiences.

Students wishing to pursue the Certificate in Biomedical Research must discuss their program of study both with their own program advisor and, where different, a program advisor in one of the Departments of Biochemistry, Cell Biology, Pharmacology or Physiology. Completion of the certificate must be recorded with the Biomedical Sciences Undergraduate Education Committee at least one week prior to the application deadline for convocation (see [Academic Schedule](#)). Students wishing to receive the Certificate in Biomedical Research must also apply through Undergraduate Student Services in their home Faculty by the application deadline for convocation (see [Academic Schedule](#)).

**Students may pursue the Certificate in Biomedical Research by fulfilling the existing requirements for their program and by completing at least ★18 in courses as follows:**

- **Presentation at a research day or conference either on or off campus.** <sup>1</sup>

**A minimum of ★3 in senior laboratory skills courses selected from:** <sup>2</sup>

- BIOCH 398 - Research Project<sup>3</sup>
- BIOCH 401 - Biochemistry Laboratory
- BIOL 391 – Techniques in Molecular Biology & Bioinformatics
- BIOL 398 - Research Project
- CELL 398 - Research Project<sup>3</sup>
- IMIN 372 – Research Techniques in Immunology
- MMI 398 - Research Project<sup>3</sup>
- MMI 391 – Current Methods in Molecular Biology
- MMI 352 – Microbial Pathogenesis
- MMI 490 – Advanced Techniques in Microbiology & Immunology
- NEURO 451 Honors Research Project in Neuroscience<sup>3</sup>
- NEURO 452 Honors Research Project in Neuroscience<sup>3</sup>
- PMCOL 301 - Introduction to Research in Pharmacology
- **PMCOL 337 - Experimental Procedures in Pharmacology**
- PHYSL 310 - Experimental Techniques in Physiology

**★3 - ★9 in courses which explore current biomedical research literature selected from:** <sup>2</sup>

- BIOCH 415 – Metabolic Modifications in Health and Disease (*new*)
- BIOCH 425 - Proteomics
- BIOCH 465 - Methods in Molecular Biophysics
- BIOCH 495 - Special Topics in Biochemistry
- BIOCH 409 –Biochemistry Tutorial
- CELL 402 – The Birth and Death of a Cell
- CELL 405 - Cell Biology of Disease
- CELL 425 - Systems Biology
- CELL 445 - Current Topics in Cell Biology
- NEURO 450 Readings on Selected Topics in Neuroscience
- **PMCOL 415 - Cardiovascular Pharmacology**
- **PMCOL 425 – Problem Solving in Pharmacology and Therapeutics**
- **PMCOL 416 - Current Topics in Endocrine Pharmacology**

- PHYSL 444 - Current Topics in Neuroscience
- PHYSL 466 - Undergraduate Tutorial
- ONCOL 425 - Advanced Topics in Cancer Research
- IMIN 452 – Advanced Immunology
- MMI 405 – Advanced Microbial Pathogenesis
- MMI 436 – Inflammation
- MMI 415 – Advanced Viral Pathogenesis
- IMIN 401 – Comparative Immunology
- IMIN 405 – Innate Immunology

**A minimum of ★9 in directed research project(s) selected from:<sup>2,4</sup>**

- BIOCH 481 - Design & Construction of Synthetic Biological Systems I
- BIOCH 482 - Design & Construction of Synthetic Biological Systems II
- BIOCH 398 - Research Project<sup>3</sup>
- BIOCH 497 - International Directed Research Project
- BIOCH 498 - Directed Research Project
- BIOCH 499 - Directed Research Project
- CELL 398 - Research Project<sup>3</sup>
- CELL 498 - Research Project
- CELL 499 - Research Project
- NEURO 451 Honors Research Project in Neuroscience<sup>3</sup>
- NEURO 452 Honors Research Project in Neuroscience<sup>3</sup>
- NEURO 498 Honors Research Project in Neuroscience I
- NEURO 499 Honors Research Project in Neuroscience II
- PMCOL 301 - Introduction to Research in Pharmacology
- PMCOL 302 - Introduction to Research in Pharmacology
- PMCOL 401 - Pharmacology Tutorial
- PMCOL 402 - Pharmacology Tutorial
- PMCOL 498 - Pharmacology Research Program
- PHYSL 461 - Undergraduate Research Project
- PHYSL 467 - Undergraduate Research Project
- PHYSL 468 - Undergraduate Research Thesis I
- PHYSL 469 - Undergraduate Research Thesis II
- MMI 398 - Research Project<sup>3</sup>
- MMI 498 – Research Project in Infection and Immunity
- MMI 499 – Independent Research in Infection and Immunity
- BIOL 498 – Undergraduate Research
- BIOL 499 – Undergraduate Research

**Notes:**

Students should plan the completion of the research certificate in consultation with the program advisor of one of the departments listed to ensure appropriate courses are taken.

1. The form of presentation includes both oral and poster.
2. The courses and research projects listed are examples and the lists are not exclusive. Courses and research projects other than those listed may be approved as equivalent. For more information, please consult your program advisor. Final approval is by the Biomedical Sciences Undergraduate Education Committee.
3. BIOCH 398, MMI 398, CELL 398 and NEURO 451/452 may be used for credit towards ★3 in senior laboratory skills courses or ★9 in directed research project(s), but **NOT** both.
4. If only ★6 in directed research project(s) is credited, other research completed during the student's undergraduate program may be considered as equivalent to ★3 in directed research courses. This research must be verified by the project supervisor, and must have been presented or disseminated in some form,

normally poster, oral, or written. The Biomedical Sciences Undergraduate Education Committee will determine equivalence.

**\*\* Note that this information will be updated shortly to reflect the changes in the pharmacology programs effective 2023/24**