



# *Electrical Engineering with Medical Biophysics*

## *Department of Electrical and Computer Engineering*

The Department of Electrical and Computer Engineering, in collaboration with the Faculty of Science, offers a five-year concurrent degree which leads to a B.E.Sc. degree in Electrical Engineering and a (three-year) B.Sc. degree with a Major in Medical Biophysics. The program culminates in a project that may involve image processing, radiology, topics related to computer-assisted surgery, drug design, development of elements of artificial heart, etc.

The B.E.Sc. in Electrical Engineering is a four year program while the B.Sc. with a Major in Medical Biophysics is of three years duration. However, some courses can be counted towards both degrees and the end result is that a program has been established which allows the student to graduate with both degrees in five years. Students take the common first year of Engineering courses. After second year, for the next three years, a combination of courses from the third and fourth years of the B.E.Sc. degree and the second and third years of the B.Sc. degree are taken depending on timetabling and prerequisites.

### *Admission and Program Structure*

In order to be eligible to enter the Major in Medical Biophysics a minimum mark of 60% in Applied Math 1413, Physics 1026, and Chemistry 1024a/b is required. In order to be considered for the concurrent program, students must apply and be admitted to the Medical Biophysics module by the Office of the Dean of the Faculty of Science after completion of the required prerequisite courses. At least 8 of the courses counted towards the B.Sc. degree must be taken from the offerings of the Faculty of Science. In addition students must take 1.0 course from each of Category A and Category B (see calendar for listing of course categories). As well, 2.0 designated essay courses must be taken (Eng Sci 2211F/G and Eng Sci 4498F/G will count as 1.0 of the essay requirement). A maximum of 10.0 courses may be double tied to both degrees. Medical Biophysics 3303E will be counted as two 0.5 fourth year technical electives in the B.E.Sc. degree program. The final course selection must be approved in consultation with both the Faculty of Engineering and the Faculty of Science.



## ***Electrical Engineering with Medical Biophysics cont'd***

***First year Engineering program*** (2010-2011): Applied Math 1413, Eng Sci 1050, Physics 1026, Applied Math 1411a/b, Chemistry 1024a/b, Eng Sci 1021a/b, Eng Sci 1022a/b/y, Eng Sci 1036a/b, 1.0 non-technical elective.

***Second year Engineering program*** (2011-2012): Applied Math 2415, Comp Sci 1037a, ECE 2205a, ECE 2277a, ECE 2240a, Eng Sci 2211F, ECE 2231b, ECE 2233b, ECE 2236b, ECE 2241b, MME 2234b. (Biology 1222 or 1223 is required for admission to the concurrent degree – may be taken in summer after year one or year two).

***Third year Engineering program:*** Applied Math 3415a, ECE 3330a, ECE 3332a, ECE 3337a, Stat Sci 2141a, ECE 3331b, ECE 3333b, ECE 3336b, ECE 3370b, ECE 3375b, 0.5 non-technical elective taken from the approved list.

***Fourth year Engineering program:*** ECE 4416, Business 2299, ECE 4429a, ECE 4437a, Eng Sci 4498G, five 0.5 technical electives. (Note: Medical Biophysics 3303E is used as two 0.5 fourth year technical electives so only three additional 0.5 technical electives are required for the B.E.Sc. degree.)

### ***Major in Medical Biophysics Module:***

(This module cannot be completed in a single year because of prerequisites. The 4000-level Medical Biophysics courses require the 3000-level Medical Biophysics courses as prerequisites (and often the Physics courses as well), so this must be taken into consideration. This module, therefore, will take at least two years to complete after having taken Biology 1222 or 1223.)

- Biology 1222 or 1223 (must be completed by the end of year 2 of the B.Sc. degree with a minimum mark of 60%)
- Calculus 2502a/b and 2503a/b (replaced by Applied Math 2415)
- Physics 2101a/b and 2102a/b
- Medical Biophysics 3501F
- Medical Biophysics 3503G
- Medical Biophysics 3970Z
- Medical Biophysics 3505F
- Medical Biophysics 3507G
- Medical Biophysics 3330F/G
- 1.0 course from: Medical Biophysics 4445a/b, 4455a/b, 4467a/b, 4475a, 4535a/b

*Note: This document is for guideline purposes only. Once a student is admitted to the concurrent program, they will receive an outline from the Faculty of Science detailing the courses which will be used for the B.Sc. degree.*