# Mechatronic Systems Engineering and Biomedical Engineering

**September 2022** (for students who entered Year 1 in September 2018)

## Year 2

### Term A
- AM 2270A: Applied Mathematics for Engineering II
- BME 3201A: Fundamentals of Biomedical Engineering Design
- CS 1037A: Computer Science Fundamentals II
- ECE 2205A: Electric Circuits I
- MSE 2200Q: Engineering Shop Safety Training
- MSE 2201A: Introduction to Electrical Instrumentation
- MSE 2212A: Mechanics of Materials
- MSE 2214A: Thermodynamics

### Term B
- AM 2276B: Applied Mathematics for Electrical & Mechanical Eng. III
- MSE 2202B: Introduction to Mechatronic Design
- MSE 2213B: Engineering Dynamics
- MSE 2233B: Circuits and Systems
- MSE 2273B: Introduction to Fluid Mechanics and Heat Transfer
- WRIT 2130G: Building Better (Communication) Bridges

## Year 3

### Term A
- AM 3415A: Applied Mathematics for Electrical Engineering
- BIOL 1001A: Biology for Sciences I
- ECE 2277A: Digital Logic Systems
- ECE 3330A: Control Systems
- MSE 3301A: Materials Selection and Manufacturing Processes
- MSE 3310A: Electric Motors and Drives
- MSE 3381A: Kinematics and Dynamics of Machines

### Term B
- BIOL 1002B: Biology for Sciences II
- ECE 3331B: Signal Processing
- ECE 3375B: Microprocessors and Microcomputers
- MSE 3302B: Sensors and Actuators
- MSE 3360B: Finite Element Methods for Mechatronic Systems
- MSE 3380B: Machine Component Design for Mechatronic Systems

## Year 4

### Term A
- Biochem 2280A: Biochemistry and Molecular Biology
- BME 3301A: Neural Systems Engineering
- ECE 4455A: Biomedical Systems Analysis
- Physiol 2130: Human Physiology
- SS 2141A: Applied Probability and Statistics for Engineers
- One 0.5-credit Biomedical Science technical elective

### Term B
- BME 3303B: Cellular Systems Engineering
- MME 4469B: Biomechanics of the Musculoskeletal System
- Physiol 2130: Human Physiology
- Two 0.5-credit Biomedical Science electives
- Two 0.5-credit Healthcare non-technical electives

## Non-technical Electives
Students are required to complete 1.5 credits of non-technical electives as part of the program.

a) *The first 0.5 credit can come from the approved non-technical elective list ([https://www.eng.uwo.ca/undergraduate/upper-year/electives.html](https://www.eng.uwo.ca/undergraduate/upper-year/electives.html)).

b) The remaining 1.0 credits must come from the following Healthcare Non-technical Elective list.

**Students must pay attention when selecting the first 0.5 credit to ensure appropriate prerequisite courses are completed for the non-technical electives below.**

### Healthcare Non-technical Electives
- Anthropology 2290F/G: Cultures of Health and Healing
- Economics 2169F/G: Economics of Health Care
- History 2195A/B: Epidemics in North America
- Law 3101A/B: Healthcare Law
- Philosophy 2071E: Biomedical Ethics
- Philosophy 2072F/G: Bioethics and Disability
- Philosophy 2715F/G: Health Care Ethics
- Political Science 2276F/G: The Politics of Health Care
- Religious Studies 2239F/G: Christian Bioethics
- Sociology 2179A/B: Promotion of Community Health
- Sociology 2180A/B: Development of Health Inequalities
- Women’s Studies 2244: Women and Health
- WRIT 3222F/G: Advanced Healthcare Communication

### Technical Elective List:
Some technical electives may not be offered in a given academic year. Consult the Department for accurate listing. Courses that do not appear on the list below require special permission from the Department.

### Biomedical Sciences Electives
- Biochemistry 3385A/B: Human Biochemistry
- Biochemistry 3386A/B: Clinical Biochemistry
- Biology 2382A/B: Cell Biology
- Biology 2581A/B: Genetics
- Chemistry 2213A/B: Organic Chemistry
- Chemistry 2283F/G: Organic Chemistry II
- Communication Sciences and Disorders 4417A/B: Hearing Science
- Health Science 2300A/B: Systemic Approach to Functional Anatomy
- Health Science 3300A/B: Anatomy of the Human Body
- Medical Science 4931F/G: Selected Topics in Medical Science
- Physiology 3140A/B: Cellular Physiology
<table>
<thead>
<tr>
<th>Year 5</th>
<th>Psychology 2220A/B</th>
<th>Intro. to Behavioural &amp; Cognitive Neuroscience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BME 4400</td>
<td>Biomedical Engineering Research Thesis (1.5-credit course)</td>
<td></td>
</tr>
<tr>
<td>ECE 4445A</td>
<td>Introduction to Digital Image Processing</td>
<td></td>
</tr>
<tr>
<td>ELI 4110F</td>
<td>Engineering Ethics, Sustainable Development and the Law</td>
<td></td>
</tr>
<tr>
<td>MSE 4401A</td>
<td>Robotic Manipulators</td>
<td></td>
</tr>
<tr>
<td>MSE 4499</td>
<td>Mechatronic Design Project</td>
<td></td>
</tr>
<tr>
<td>One 0.5-credit non-technical elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Term B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BME 4400</td>
<td>Biomedical Engineering Research Thesis (1.5-credit course)</td>
<td></td>
</tr>
<tr>
<td>ELI 3200B</td>
<td>Engineering Innovation I: New Venture Creation</td>
<td></td>
</tr>
<tr>
<td>MSE 4499</td>
<td>Mechatronic Design Project</td>
<td></td>
</tr>
<tr>
<td>Two 0.5-credit BME technical electives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One 0.5-credit MSE technical elective</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(https://www.eng.uwo.ca/undergraduate/upper-year/next.html)

<table>
<thead>
<tr>
<th>Biomedical Engineering (BME) Electives</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CBE 4421A/B</td>
<td>Intro. to Biomaterials Engineering</td>
<td></td>
</tr>
<tr>
<td>ECE 4438A/B</td>
<td>Advanced Image Processing and Analysis</td>
<td></td>
</tr>
<tr>
<td>Medical Biophysics 3507F/G</td>
<td>Analysis of Oxygen Transport</td>
<td></td>
</tr>
<tr>
<td>Medical Biophysics 3645A/B</td>
<td>Intro. to Biomedical Optics</td>
<td></td>
</tr>
<tr>
<td>Medical Biophysics 4475A/B</td>
<td>Medical Imaging</td>
<td></td>
</tr>
<tr>
<td>Medical Biophysics 4535A/B</td>
<td>Hemodynamics</td>
<td></td>
</tr>
</tbody>
</table>