

# ELECTROMECHANICAL ENGINEERING BACHELOR OF SCIENCE

## Leading to a Bachelor of Science Degree in Electromechanical Engineering

The Bachelor of Science in Electromechanical Engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

The Electromechanical Engineering (BELM) program is a four-year engineering program with a dynamic interdisciplinary character and unique approach to learning. Grounded in a solid foundation of mathematics, science, and humanities, and social sciences, the BELM program incorporates all the essential elements of an electrical and mechanical engineering curriculum. The BELM program features engineering design courses, extensive exposure to engineering problem-solving, and a faculty committee management structure that responds quickly to industrial change and academic needs. Wentworth stresses the importance of hands-on experience and extensive lab work. BELM students spend a significant amount of time working in our state-of-the-art laboratories with computers and microprocessors being a large part of the program. Students use computers and test equipment extensively to verify and develop principles of engineering in diverse areas including mechanics of materials, embedded microcontroller systems, analog, and digital circuit design, thermodynamics, vibrations, materials science, feedback controls, and machine design.

### Program Educational Objectives

Graduates of the electromechanical engineering program will (within a few years of graduation):

- Contribute significantly in the design and development of complex electromechanical systems
- Work effectively as members of multidisciplinary teams that analyze data critically, synthesize information and implement ethical solutions for the betterment of society
- Prepare and present technical information professionally and effectively to various audiences
- Further their education through directed or independent studies to advance themselves personally and professionally

The Electromechanical Engineering program at Wentworth is committed to both a collaborative teaching model and a committee management structure, thereby providing the students access to many innovative interdisciplinary educational opportunities.

### Student Outcomes

Students from the electromechanical engineering program will attain (by the time of graduation):

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety,

and welfare, as well as global, cultural, social, environmental, and economic factors.

3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Total credits for degree: 129 credits

This is a four-year program, starting in the fall semester of the student's first year and planned to end in the summer semester of the student's fourth year.

| Course                 | Title                                  | Credits   |
|------------------------|--|-----------|
| <b>Freshman Year</b>   |  |           |
| <b>Fall Semester</b>   |  |           |
| ENGR1100               | INTRODUCTION TO ENGINEERING EXPERIENCE | 2         |
| ENGR1205               | ENGINEERING LABORATORY-BELM            | 2         |
| MATH1750               | ENGINEERING CALCULUS I                 | 4         |
| PHYS1250               | ENGINEERING PHYSICS I                  | 4         |
| English Sequence*      |  | 4         |
| <b>Credits</b>         |  | <b>16</b> |
| <b>Spring Semester</b> |  |           |
| ENGR1300               | FIRST-YEAR ENGINEERING DESIGN          | 2         |
| ENGR1405               | APPLIED ENGINEERING ANALYSIS-BELM      | 2         |
| MATH1850               | ENGINEERING CALCULUS II                | 4         |
| PHYS1750               | ENGINEERING PHYSICS II                 | 4         |
| English Sequence*      |  | 4         |
| <b>Credits</b>         |  | <b>16</b> |
| <b>Sophomore Year</b>  |  |           |
| <b>Fall Semester</b>   |  |           |
| ELEC2275               | DIGITAL LOGIC                          | 4         |
| MECH2300               | ENGINEERING GRAPHICS                   | 3         |
| CHEM1100               | GENERAL CHEMISTRY I                    | 4         |
| MATH2500               | DIFFERENTIAL EQUATIONS                 | 4         |
| HSS Elective*          |  | 4         |
| <b>Credits</b>         |  | <b>19</b> |
| <b>Spring Semester</b> |  |           |
| ELEC2300               | CIRCUIT ANALYSIS                       | 4         |
| MECH2250               | ENGINEERING THERMODYNAMICS I           | 4         |
| MECH2400               | APPLIED MECHANICS                      | 4         |
| MATH2025               | MULTIVARIABLE CALCULUS                 | 4         |
| <b>Credits</b>         |  | <b>16</b> |

| Course                 | Title                                  | Credits    |
|------------------------|--|------------|
| <b>Summer Semester</b> |  |            |
| COOP3000               | PRE CO-OP WORK TERM (OPTIONAL)         | 0          |
| <b>Credits</b>         |  | <b>0</b>   |
| <b>Junior Year</b>     |  |            |
| <b>Fall Semester</b>   |  |            |
| ELEC2850               | MICROCONTROLLERS USING C PROGRAMS      | 4          |
| ELEC3250               | ANALOG CIRCUIT DESIGN                  | 4          |
| MECH3100               | ENGINEERING FLUID MECHANICS            | 4          |
| MATH2100               | PROBABILITY & STATISTICS FOR ENGINEERS | 4          |
| COOP2500               | CO-OP INSTITUTE                        | 0          |
| <b>Credits</b>         |  | <b>16</b>  |
| <b>Spring Semester</b> |  |            |
| COOP3500               | COOP EDUCATION 1                       |            |
| <b>Credits</b>         |  | <b>0</b>   |
| <b>Summer Semester</b> |  |            |
| ELEC3600               | SIGNALS AND SYSTEMS                    | 4          |
| MECH3600               | MATERIALS SCIENCE                      | 4          |
| MECH3900               | ENGINEERING HEAT TRANSFER              | 4          |
| Technical Elective     |  | 3          |
| <b>Credits</b>         |  | <b>15</b>  |
| <b>Senior Year</b>     |  |            |
| <b>Fall Semester</b>   |  |            |
| COOP4500               | COOP EDUCATION 2                       |            |
| <b>Credits</b>         |  | <b>0</b>   |
| <b>Spring Semester</b> |  |            |
| ELEC4475               | FEEDBACK AND CONTROL                   | 4          |
| ELMC5000               | SENIOR DESIGN I                        | 4          |
| MECH3850               | ENGINEERING DYNAMICS                   | 4          |
| HSS Elective*          |  | 4          |
| <b>Credits</b>         |  | <b>16</b>  |
| <b>Summer Semester</b> |  |            |
| ELMC4125               | ELECTROMECHANICAL SYSTEMS              | 4          |
| ELMC5500               | SENIOR DESIGN II                       | 4          |
| Technical Elective     |  | 3          |
| HSS Elective*          |  | 4          |
| <b>Credits</b>         |  | <b>15</b>  |
| <b>Total Credits</b>   |  | <b>129</b> |

A minimum of 20 credits total, including English, humanities, and social science credit, is required to complete the humanities and social sciences graduation requirement.

#### ENGL/HSS Note

Students are required to complete:

- At least one course in Humanities: HSSI, HIST, HUMN, LITR and PHIL
- At least one course in the Social Sciences: HSSI, COMM, ECON, POLS, PSYC and SOCL
- The remaining course from either the Humanities or Social Sciences category.

Students with a three English course sequence may use the third English course to satisfy a Humanities requirement.