

Computer Engineering Technical Electives 2019–2020

Five (5) Technical Electives are required in the Computer Engineering Program. Those five electives must be selected from the following list of courses. Of the five courses, not more than two (2) may be Electrical Engineering courses (identified with an asterisk *).

FALL TERM 2019

| Course | Prerequisites | Cr. Hrs. |
|-------------------|--|----------|
| ECE 3580 * | Foundations of Electromagnetics PHYS 2152, MATH 3132, ECE 2240 | 4 |
| ECE 3670 * | Electronics 3E ECE 2160 | 4 |
| ECE 3720 * | Electric Power and Machines ECE 2262 | 4 |
| ECE 4150 * | Control Systems ECE 3780, ECE 2160 | 4 |
| ECE 4260 * | Communication Systems STAT 2220, ECE 3780 | 4 |
| ECE 4390 * | Engineering Computation 4E MATH 3132, ECE 2240 | 4 |
| <i>ECE 4450</i> | <i>Applied Computational Intelligence</i> MATH 3132 | 4 |
| ECE 4530 | Parallel Processing COMP 2140, ECE 3760 | 4 |
| <i>ECE 4560</i> | <i>Modern Computing Systems</i> ECE 3610 | 4 |
| ECE 4540 | Wireless Networks ECE 3700, ECE 3780 | 4 |
| ECE 4610 * | Biomedical Instrumentation and Signal Processing ECE 2160, ECE 3780 | 4 |
| ECE 4740 | Digital System Implementation ECE 4240 | 4 |
| <i>ECE 4850 *</i> | <i>(T05) Basics of Biological Signals Analysis</i> ECE 3780 | 4 |
| COMP 2160 | Programming Practices COMP 1020 | 3 |
| COMP 3020 | Human-Computer Interaction 1 COMP 2140 | 3 |
| COMP 3190 | Introduction to Artificial Intelligence COMP 2140 | 3 |
| COMP 3380 | Database Concepts and Usage COMP 2140 | 3 |
| COMP 3490 | Computer Graphics 1 COMP 2140, MATH 1210, MATH 1510 | 3 |
| COMP 4140 | Introduction to Cryptography and Cryptosystems COMP 2130 | 3 |
| COMP 4710 | Introduction to Data Mining COMP 3380 | 3 |

WINTER TERM 2020

| Course | Prerequisites | Cr. Hrs. |
|------------|---|----------|
| ECE 3540 * | Advanced Circuit Analysis and Design ECE 2262, MATH 3132 | 4 |
| ECE 3600 * | Physical Electronics PHYS 2152, MATH 3132, ECE 3670 | 4 |
| ECE 4100 * | Microelectronic Fabrication ECE 3670 | 4 |
| ECE 4150 * | Control Systems ECE 3780, ECE 2160 | 4 |
| ECE 4160 * | Control Engineering ECE 4150 | 4 |
| ECE 4180 | Introduction to Robotics ECE 4150, ECE 4240 | 4 |
| ECE 4250 | Digital Communications ECE 4260, ECE 3780 | 4 |
| ECE 4260 * | Communication Systems STAT 2220, ECE 3780 | 4 |
| ECE 4440 | Computer Vision ECE 3780 | 4 |
| ECE 4860 | (T08) Sensors, Instrumentation, and the IoT ECE 2160 | 4 |
| COMP 2150 | Object Orientation COMP 2140, COMP 2160 | 3 |
| COMP 3010 | Distributed Computing ECE 3740 or COMP 2150 | 3 |
| COMP 3350 | Software Engineering 1 ECE 3740 or COMP 2150 | 3 |
| COMP 4020 | Human-Computer Interaction 2 COMP 3020 | 3 |
| COMP 4190 | Artificial Intelligence COMP 3190 | 3 |
| COMP 4350 | Software Engineering 2 COMP 3350 | 3 |
| COMP 4360 | Machine Learning COMP 3190 | 3 |
| COMP 4380 | Database Implementation COMP 3380 | 3 |
| COMP 4430 | Operating Systems 2 COMP 2160, COMP 3430 | 3 |
| COMP 4490 | Computer Graphics 2 COMP 3490 | 3 |
| COMP 4580 | Computer Security COMP 3430, COMP 3010 | 3 |

Elective Courses Not Offered in 2019-2020

| Course | Prerequisites | Cr. Hrs. |
|-----------|--|----------|
| ECE 3750 | Systems Engineering Principles 2 ECE 3740 | 4 |
| ECE 3770 | Digital Systems Design 2 ECE 4240 | 4 |
| ECE 4420 | Digital Control ECE 4830, ECE 4150 | 4 |
| ECE 4520 | Simulation and Modelling STAT 2220, COMP 2140 | 4 |
| ECE 4860 | (T01) Random Signals and Processes STAT 2220, ECE 3780 | 4 |
| ECE 4860 | (T02) Biomedical Signal Processing Permission of the Instructor (S. Sherif) | 4 |
| COMP 3290 | Introduction to Compiler Construction COMP 2140, ECE 3610 | 3 |
| COMP 4200 | Expert Systems COMP 3190 | 3 |

Note: Courses in italics are either new topics course offerings or indicate a change in course number.

Natural Science Electives – Computer Engineering 2019–2020

Computer Engineering students are required to complete two (2) Natural Science Electives as part of their program. These courses may be taken anytime during the student's program. One course must be selected from *Group A*. The second may be selected from either *Group A* or *Group B*.

Approved Natural Science Electives – Group A (1 required)

FALL TERM 2019

| Course | | Prerequisites | Cr. Hrs. |
|-----------|---|----------------------|----------|
| CHEM 1310 | University 1 Chemistry: An Introduction to Physical Chemistry | CHEM 1300 | 3 |
| PHYS 2600 | Electromagnetic Field Theory | PHYS 2152, MATH 1710 | 3 |

WINTER TERM 2020

| Course | | Prerequisites | Cr. Hrs. |
|-----------|---|----------------------|----------|
| CHEM 1310 | University 1 Chemistry: An Introduction to Physical Chemistry | CHEM 1300 | 3 |
| PHYS 3630 | Electro- and Magnetostatic Theory | PHYS 2600, MATH 3132 | 3 |

Approved Natural Science Electives – Group B

FALL TERM 2019

| Course | | Prerequisites | Cr. Hrs. |
|-----------|---|--|----------|
| ASTR 1810 | Introduction to Astronomy: The Magnificent Universe | | 3 |
| ASTR 3180 | Stars | Permission of the Physics Department | 3 |
| BIOL 1020 | Biology 1: Principles and Themes | | 3 |
| BIOL 1300 | Economic Plants | | 3 |
| BIOL 1410 | Anatomy of the Human Body | | 3 |
| ENTM 2050 | Introduction to Entomology | | 3 |
| GEOL 1340 | The Dynamic Earth | | 3 |
| MBIO 1220 | Essentials of Microbiology | | 3 |
| PHYS 2260 | Optics | PHYS 1050, MATH 1510, MATH 1210, MATH 1710 | 3 |

WINTER TERM 2020

| Course | | Prerequisites | Cr. Hrs. |
|-----------|--|----------------------|----------|
| CHEM 1320 | University 1 Chemistry: An Introduction to Organic Chemistry | CHEM 1300 | 3 |
| GEOL 1340 | The Dynamic Earth | | 3 |
| PHYS 2386 | Introduction to Quantum Mechanics and Special Relativity | PHYS 2152, MATH 1710 | 3 |
| PHYS 2650 | Classical Mechanics 1 | PHYS 2152, MATH 3132 | 3 |
| PHYS 3220 | Medical Physics and Physiological Measurements | ECE 3580 | 3 |

Note: Term information is preliminary and is subject to change prior to the time of registration. Students should consult Aurora for the most up-to-date schedule information.