Electrical and Computer Engineering Undergraduate Advising Manual

Department of Engineering
University of Massachusetts Boston

Revised: August 15, 2021

UMASS BOSTON

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1. Introduction

The University of Massachusetts Boston Engineering Department offers two bachelor's degree programs: one in Electrical Engineering (EE) and one in Computer Engineering (CE). Electrical and Computer Engineering (ECE) are closely related engineering disciplines concerned with a wide variety of topics in signals, systems and communications, electronics, photonics, optoelectronics, as well as design, analysis and applications of computers. They are most relevant to almost everything in our daily life, ranging from fancy toys to highly sophisticated electronics such as cell phones, computers, audio and video components. As such, ECE curricula are among the most demanding and stimulating to complete. Both EE and CE curricula provide a solid foundation in basic science and mathematics as well as the ability to focus on either EE or CE areas. They also require an in-depth study in an area outside of ECE for breadth in recognition of the multidisciplinary nature of the real-world problems our graduates will face.

2. Mission Statement

The faculty of the Department of Engineering at the University of Massachusetts Boston are committed to providing a rigorous educational experience that prepares students to pursue further study and to professionally and ethically practice engineering in a competitive global setting. The mission of the program is to provide stimulating and flexible curricula in fundamental and advanced topics in electrical and computer engineering, basic sciences, mathematics, and humanities, in an environment that fosters development of analytical, computational, and experimental skills and that involves students in design projects and research experiences; and to provide our engineering graduates with the tools, skills and competencies necessary to understand and apply today's technologies and become leaders in developing and deploying tomorrow's technologies.

3. ABET Criteria

Our EE and CE Bachelor of Science programs are ABET accredited (http://www.abet.org). In compliance with ABET requirements, the faculty of the Electrical and Computer Engineering programs have established the following student learning outcomes and program educational objectives for EE and CE Bachelor of Science (B.S.) degree programs.

3.1 Electrical Engineering Program

3.1.1 EE Learning Outcomes

Our electrical engineering graduates must attain:

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.

3.1.2 EE Program Educational Objectives

Our electrical engineering graduates will have:

1. Developed careers in engineering and other related fields that enhance the quality of life for all people through technical proficiency, innovative design and socially responsible development of products and systems.
2. Engaged in advanced study, if desired, in pursuit of research and academic professions that contribute to technological and scientific advancement and education.
3. Become leaders at their place of employment through leading edge knowledge of their field and keen understanding of team dynamics.

3.2 Computer Engineering Program

3.2.1 CE Learning Outcomes

Our computer engineering graduates must attain:

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.

3.2.2 CE Program Educational Objectives

Our computer engineering graduates will have:

1. Developed careers in engineering and other related fields that enhance the quality of life for all people through technical proficiency, innovative design and socially responsible development of products and systems.
2. Engaged in advanced study, if desired, in pursuit of research and academic professions that contribute to technological and scientific advancement and education.
3. Become leaders at their place of employment through leading edge knowledge of their field and keen understanding of team dynamics.

4. Faculty Advising

The success of each student within the program will depend on effective faculty advising. Every undergraduate student in the Electrical and Computer Engineering programs will be assigned a faculty advisor. All incoming freshmen or transfer students will receive academic counseling with a faculty member. Together, they will develop a personalized degree plan and timeline for completion. The plan will be reviewed by the student and their advisor on a regular basis and revised as individual circumstances change. The path of study must consist of a set of courses that satisfy the program outcomes and objectives outlined above in the chosen engineering discipline and degree requirements. The sample programs and the program checklist used by the faculty advisors illustrate course selections that will help students meet the program objectives and outcomes.

The faculty advisor assists the student in developing an approved program, including assignment of credits to the proper categories and judging the appropriateness of area designators. However, it should be understood that satisfaction of degree requirements is ultimately the responsibility of the student. The student is expected to understand the degree requirements and engage in careful program planning with the faculty advisor. Students should also be familiar with the university graduation requirements.

Full-time students, under normal circumstances, are expected to complete their degree requirements in no more than four years or eight semesters, except in special circumstances such as pursuing a double major, a special program, or inability to attend full-time. Those who combine work with their study must have a plan to move through the curriculum in a timely manner. All students must take ownership of their academic plan. Developing and completing this plan has many benefits. First, it will help clarify the curricular requirements for our students. Second it will motivate students to set precise deadlines by which they can measure their

progress. Satisfying these deadlines will help them retain and build confidence. Finally, a detailed plan of action can help students stay focused - resulting in better academic results and timely graduation.

Students may also receive advising from faculty advisors on other aspects of their academic career, such as admission to graduate and professional schools or career planning. Faculty advisors may be able to direct students to other advising and counseling resources that provide information on internship opportunities, and direct students to independent research and guided independent studies. Communicating with a faculty advisor is also an effective means for undergraduate students to provide valuable feedback on all aspects of their educational experiences to improve the undergraduate education for all students. The Electrical and Computer Engineering faculty make every effort to be available to their advisees, particularly during the scheduled fall and spring term advising periods. The student is required to meet with the faculty advisor at least once – and preferably more – each semester. It is the responsibility of the student to initiate these meetings with the advisor. It is important that students remain in close contact with their advisors and consult with them before making changes in their program. The faculty advisor must release advising holds on a student's registration record before she/he can register for classes. This is typically done during the advising period of each semester when students can register for courses for the next semester. The advising hold will not be released until the advisee has reviewed her/his course plans with the advisor. The faculty advisor will also sign add/drop forms. Please note that unless prior arrangements have been made, no faculty member other than the student's own advisor can sign the required forms.

5. Degree Requirements

5.1 Graduation Requirements

5.1.1 University Graduation Requirements

a) **First-Year Seminar** (4 credits) can be taken as a one-semester 4-credit course (course numbers in the 100s that end with the letter G) during freshman year or as two freshman seminar courses, **Intro-D 187S** Freshman seminar I (2 credits) and **Intro-D 188S** Freshman seminar II (2 credits). All students entering UMB with less than 30 credits are required to take this course.

b) **Intermediate Seminar** (3 credits) is taken during the sophomore year. All students entering UMB with less than 90 credits are required to take an intermediate seminar course, as defined by the UMB graduation requirements. Intermediate seminar courses have course numbers in the 200s that end with the letter G.

c) Two courses in writing and composition: **ENGL 101** (3 credits) and **ENGL 102** (3 credits).

d) Five additional general education courses that satisfy the diversity requirement and some of the areas in social and behavioral sciences, arts and humanities, world languages and cultures.

e) Demonstrate writing proficiency by completing the **Writing Proficiency Requirement.** Students need to take the **Writing Proficiency Exam** (WPE) before or during their junior year after taking the Intermediate Seminar and when having between 60 and 75 credits.

For more information, please check the university website:
http://www.umb.edu/academics/vpass/undergraduate_studies/general_education_requirements

5.1.2 Engineering Graduation Requirements

1. Students must maintain a **minimum 2.5 GPA** in all major related courses required for the Electrical or Computer Engineering major (Major GPA Computation: all courses including mathematics, physics, engineering, computer science, and thematic electives that are used to fulfill degree requirements, if a course is repeated, only the most recent course grade shall be used).
2. Students must receive **at least a C-** in all mathematics, physics, engineering, computer science, thematic elective courses (except the one thematic elective that can be taken P/F as described in item 4 below) that are used to fulfill degree requirements.
3. Student must have minimum 30 credits of upper-level engineering courses taken at UMass Boston.
4. Students may take **one thematic elective course P/F**. All other major related courses must be graded. Computer Engineering majors of Catalog Year Fall 2021 or later are not required to take thematic electives.
5. To graduate with **Honors in Electrical or Computer Engineering**, students must achieve the following:
   i) 3.000 GPA overall.
   ii) 3.300 GPA in the major as calculated in 1.
   iii) Complete and present an honors thesis that the Engineering faculty deem worthy of Honors recognition.

5.2 Mathematics Requirements

All ECE majors must take these five mathematics courses from the Mathematics Department and the Engineering Department that include:

- **MATH 140** Calculus I (4 credits)
- **MATH 141** Calculus II (4 credits)
- **MATH 242** Multi-variable and vector calculus (4 credits)
- **MATH 260** Linear Algebra (3 credits)
- **ENGIN 211** Engineering Math (3 credits)

MATH 140, MATH 141 and MATH 242 are courses taught in sequence and must be completed in this order. Students may not repeat lower-level courses after completion of a higher level course

in a sequence, and doing so will result in a loss of credit. If a student has not met the minimum grade requirement for MATH 140 or MATH 141, they should be encouraged to repeat the course **before** moving forward in the sequence. Students who have entered the engineering program with substandard grades in these courses may audit these courses, and the department will keep an unofficial record of the student's performance as reported by the instructor in the course.

In addition, Electrical Engineering majors must take **MATH 270** Ordinary Differential Equations (3 credits) and Computer Engineering majors must take **CS 220** Applied Discrete Mathematics (3 credits). Mathematics courses lower than **MATH 140** such as **MATH 115** College Algebra or **MATH 130** Pre-calculus courses do not count towards mathematics requirements.

Courses in this group may **not** be taken **Pass/Fail**, and C- or better grades are required of all these courses.

5.3 Physics Requirements

All ECE majors must take four Physics courses from the Physics Department:

- **PHYSIC 113** Fundamental Physics I (4 credits)
- **PHYSIC 181** Physics Lab I (2 credits)
- **PHYSIC 114** Fundamental Physics II (4 credits)
- **PHYSIC 182** Physics Lab II (2 credits).

Algebra-based College Physics I and II (PHYSIC 107 and 108) are not acceptable.

Courses in this group may **not** be taken **Pass/Fail**, and C- or better grades are required of all these courses.

5.4 Thematic Requirements

All EE majors and those CE majors of Catalog Year Spring 2021 or earlier* must take **at least two courses** in one area within the College of Science and Mathematics, but outside of ECE and Computer Science as thematic electives for breadth so they can learn the vocabulary of other disciplines. The EE curriculum have the flexibility for up to four thematic courses. Thematic elective courses may be applied toward a double major. All thematic elective courses must be from a single discipline; courses from additional disciplines will not be applied toward the thematic elective requirement even if they are on the list of approved thematic electives. For example, if a student has taken thematic electives from the list below in both Physics and Biology, only courses in either Physics or Biology at the discretion of the student but not both can be applied toward the thematic elective requirement.

***CE majors of Catalog Year Fall 2021 and later are not required to take thematic electives**

5.4.1 Physics

Course number	Title	Credits	Prerequisites
PHYSIC 211	Introduction to Contemporary Physics	3	PHYSIC 114 or permission of instructor
PHYSIC 214	Thermodynamics	3	MATH 141 and PHYSIC 113 or permission of instructor
PHYSIC 312	Mechanics	3	PHYSIC 211 or permission of instructor; co-requisite: MATH 270
PHYSIC 350	Statistical Physics	3	Physic 312 or permission of instructor
PHYSIC 421	Atomic Physics and Introduction to Quantum Mechanics	3	PHYSIC 312 or permission of instructor

5.4.2 Chemistry

Course number	Title	Credits	Prerequisites
CHEM 115	Chemical Principles I Lecture	3	MATH 130 or placement into MATH 140; co-requisite CHEM 117
CHEM 117	Chemical Principles I Laboratory	2	Co-requisite: CHEM 115
CHEM 116	Chemical Principles II Lecture	3	C- or better in CHEM 115, MATH 130; co-requisite CHEM 118
CHEM 118	Chemical Principles II Laboratory	2	Co-requisite: CHEM 116
CHEM 251	Organic Chemistry I	3	C- or better in CHEM 116 or C- or better in CHEM 104; co-requisite or pre-requisite: Chem 255
CHEM 255	Organic Chemistry I Laboratory	2	Chem 116 & 118 or Chem 104; co-requisite: CHEM 251
CHEM 252	Organic Chemistry II	3	C- or better in CHEM 251 or CHEM 253; Pre-requisite: CHEM 255; Pre-requisite or co-requisite: CHEM 256
CHEM 256	Organic Chemistry II Laboratory	2	CHEM 255 or CHEM 253; Co-requisite: CHEM 252
CHEM 311	Analytical Chemistry	4	C- or better in CHEM 116; MATH 140 and PHYSIC 113
CHEM 312	Physical Chemistry	4	CHEM 311

*CHEM 115 and 117 must be taken together and are counted as one course, CHEM 116 and 118 must be taken together and are counted as one course. Same with CHEM 251 and 255, and CHEM 252 and 256.

5.4.3 Biology

Course number	Title	Credits	Prerequisites
BIOL 111	General Biology I	4	None
BIOL 112	General Biology II	4	BIOL 111
BIOL 210 or BIOL 212, 3 credits, lecture only	Cell Biology	4	BIOL 112 and CHEM 115 and 117; co-requite: MATH 13 or placement into MATH 140
BIOL 252 Or BIOL 254, 3 credits, lecture only	Genetics	4	BIOL 112 and CHEM 115 and 117; co-requite: MATH 13 or placement into MATH 140
BIOL 290	Population Biology	3	MATH 13 or placement into MATH 140
BIOL 316 Or BIOL 318, 3 credits, lecture only	Neurobiology	4	BIOL 212/201 and BIOL 252/254 or permission of instructor

5.4.4 Environmental Science

Course number	Title	Credits	Prerequisites
ENVSCI 120	Introduction to Environmental, Earth and Ocean Sciences	3	None
ENVSCI 122	Introduction to Environmental Policy & Management	3	None
ENVSCI 210	Earth's Dynamic Systems	4	ENVSCI 120 and 121 or permission of instructor
ENVSCI 225	Weather and Climate	3	Pre-requisite: 30 credits
ENVSCI 226	Introduction to Oceanography	3	ENVSCI 120, 121, 122 or permission of instructor
ENVSCI 260	Global Environmental Change	3	ENVSCI 120, or BIOL 111 or permission of instructor
ENVSCI 267L	Introduction to Coastal Biological Systems	3	ENVSCI 120, 121, 122 or permission of instructor
ENVSCI 270	Cities and the Environment	3	ENVSCI 122 or permission of instructor
ENVSCI 281	Introduction to Geographic Information Systems	4	ENVSCI 120, 121, 122 and Math 125 or ENVSCI 261

Students are encouraged to seek advice from these departments for even more course options and seek approval from their advisor.

Students may take one thematic elective course P/F. For the rest of thematic electives, and C- or better grades are required.

5.5 B.S. EE Specific Requirements

The B. S. degree program in Electrical Engineering consists of a minimum of one hundred and twenty-six (126) credits that include the university, mathematics, physics, thematic, and the following discipline specific requirements:

- One programming course: **CS 109** Computer Programming for Engineers (3 credits)
  This course may **not** be taken **Pass/Fail**, and a C- or better grade is required.

The following engineering courses are required:

- **ENGIN 104** Intro to ECE (3 credits)
- **ENGIN 231** Circuit Analysis I (3 credits)
- **ENGIN 271** Circuits Lab I (1 credit)
- **ENGIN 232** Circuit Analysis II (3 credits)
- **ENGIN 272** Circuits Lab II (1 credit)
- **ENGIN 241** Digital Systems with Lab (4 credits)
- **ENGIN 365** Electronics I with Lab (4 credits)
- **ENGIN 366** Electronics II with Lab (4 credits)
- **ENGIN 321**Signals and Systems (3 credits)
- **ENGIN 322** Probability and Random Processes (3 credits)
- **ENGIN 331** Fields and Waves (3 credits)
- **ENGIN 491** Senior Design Project I (3 credits)
- **ENGIN 492** Senior Design Project II (3 credits),
- At least four ECE elective courses.
- Two additional elective courses for a minimum of six (6) combined credits. Each of these courses may be an elective in ECE or in the same chosen thematic area as the first two thematic electives. This flexibility is designed to give those students who wish to gain depth in a thematic area the opportunity to do so.

Courses in this group may **not** be taken **Pass/Fail**, and C- or better grades are required of all these courses.

5.5.1 Approved ECE Electives for Electrical Engineering Majors

The following ECE courses are approved as ECE electives for EE Majors:

- **ENGIN 304** Engineering Design (3 credits)
- **ENGIN 332** Fields & Waves II (3 credits)
- **ENGIN 341** Advanced Digital Design (3 credits)
- **ENGIN 346** Microcontrollers (3 credits)
- **ENGIN 351** Fundamentals of Semiconductor Devices (3 credits)
- **ENGIN 451** Semiconductor Device Design, Simulation and Fabrication (3 credits)
- **ENGIN 471** R/F Microwave Circuits (3 credits)
- **ENGIN 435** Antenna Design (3 credits)
- **ENGIN 441** Embedded Systems (3 credits)
- **ENGIN 442** Internet of Things (3 credits)
- **ENGIN 446** Computer Architecture Design (3 credits)
- **ENGIN 478** Independent Study*
- **ENGIN 480** Special Topics

*Engin 478 can be taken at most twice for a maximum of 6 credits.

5.6 B.S. CE Specific Requirements for Students of **Catalog Year Spring 2021 or Earlier**

The B. S. degree program in Computer Engineering consists of a minimum of one hundred and twenty-seven (127) credits that include engineering, mathematics, physics, computer science, thematic, and general education requirements.

The following Engineering and Computer Science courses are required:

- **ENGIN 104** Intro to ECE (3 credits)
- **CS 110** Intro to Computing (4 credits)
- **CS 210** Intermediate Computing with Data Structures (4 credits)
- **ENGIN 231** Circuit Analysis I (3 credits)
- **ENGIN 271** Circuits Lab I (1 credit)
- **CS 240** Programming in C (3 credits)
- **ENGIN 232** Circuit Analysis II (3 credits)
- **ENGIN 272** Circuits Lab II (1 credit)
- **ENGIN 241** Digital Systems with Lab (4 credits)
- **CS 310** Advanced Data Structures and Algorithms (3 credits)
- **ENGIN 321** Signals and Systems (3 credits)
- **ENGIN 322** Probability and Random Processes (3 credits)
- **ENGIN 341** Advanced Digital Design (3 credits)
- **ENGIN 346** Microcontrollers (3 credits)
- **ENGIN 365** Electronics I with Lab (4 credits)
- **ENGIN 446** Computer Architecture Design (3 credits)

- **ENGIN 491** Senior Design Project I (3 credits)
- **ENGIN 492** Senior Design Project II (3 credits),
- **Two additional elective courses.** Each of these courses may be an elective in ECE/CS or in the same chosen thematic area as the first two thematic electives. This flexibility is designed to give those students who wish to gain depth in a thematic area the opportunity to do so.

Courses in this group may **not** be taken **Pass/Fail**, and C- or better grades are required of all these courses.

5.6.1 Approved ECE/CS Electives for Computer Engineering Majors of **Catalog Year Spring 2021 or Earlier**

The following ECE/CS courses are approved as ECE/CS electives for CE Majors:

- **ENGIN 304** Engineering Design (3 credits)
- **ENGIN 331** Fields & Waves (3 credits)
- **ENGIN 332** Fields & Waves II (3 credits)
- **ENGIN 351** Fundamentals of Semiconductor Devices (3 credits)
- **ENGIN 451** Semiconductor Device Design, Simulation and Fabrication (3 credits)
- **ENGIN 366** Electronics II with Lab (4 credits)
- **ENGIN 471** R/F Microwave Circuits (3 credits)
- **ENGIN 435** Antenna Design (3 credits)
- **ENGIN 441** Embedded Systems (3 credits)
- **ENGIN 442** Internet of Things (3 credits)
- **CS 420** Introduction to the Theory of Computation (3 credits)
- **CS 438** Applied Machine Learning (3 credits)
- **CS 444** Introduction to Operating Systems (3 credits)
- **CS 445** Real-Time Systems (3 credits)
- **CS 446** Introduction to Internetworking (3 credits)
- **CS 451** Compilers (3 credits)
- **CS 470** Introduction to Artificial Intelligence (3 credits)
- **ENGIN 478** Independent Study*
- **ENGIN 480** Special Topics

*Engin 478 can be taken at most twice for a maximum of 6 credits.

5.7 B.S. CE Specific Requirements for Students of **Catalog Year Fall 2021 or Later**

The B. S. degree program in Computer Engineering consists of a minimum of one hundred and thirty (130) credits that include engineering, mathematics, physics, computer science, and general education requirements.

The following Engineering and Computer Science courses are required:

- **ENGIN 104** Intro to ECE (3 credits)
- **CS 110** Intro to Computing (4 credits)
- **CS 210** Intermediate Computing with Data Structures (4 credits)
- **ENGIN 231** Circuit Analysis I (3 credits)
- **ENGIN 271** Circuits Lab I (1 credit)
- **CS 240** Programming in C (3 credits)
- **ENGIN 232** Circuit Analysis II (3 credits)
- **ENGIN 272** Circuits Lab II (1 credit)
- **ENGIN 241** Digital Systems with Lab (4 credits)
- **ENGIN 246** Computer Organization and Assembly Language (3 credits)
- **CS 310** Advanced Data Structures and Algorithms (3 credits)
- **ENGIN 321** Signals and Systems (3 credits)
- **ENGIN 322** Probability and Random Processes (3 credits)
- **ENGIN 341** Advanced Digital Design (3 credits)
- **ENGIN 342** Introduction to Computer Communications and Security (3 credits)
- **ENGIN 346** Embedded Systems (3 credits, new course title)
- **ENGIN 365** Electronics I with Lab (4 credits)
- **ENGIN 448** Operating Systems (3 credits)
- **ENGIN 491** Senior Design Project I (3 credits)
- **ENGIN 492** Senior Design Project II (3 credits)
- **One CE elective:** ENGIN 441 System on Chip (SoC) Design (3 credits), ENGIN 442 Internet of Things (3 credits), or ENGIN 446 Computer Architecture Design (3 credits).
- **Two additional ECE/CS elective courses.** See approved course list below.

Courses in this group may **not** be taken **Pass/Fail**, and C- or better grades are required of all these courses.

5.7.1 Approved ECE/CS Electives for Computer Engineering Majors of **Catalog Year Fall 2021 or Later**

The following ECE/CS courses are approved as ECE/CS electives for CE Majors:

- **ENGIN 304** Engineering Design (3 credits)
- **ENGIN 331** Fields & Waves (3 credits)
- **ENGIN 332** Fields & Waves II (3 credits)
- **ENGIN 351** Fundamentals of Semiconductor Devices (3 credits)
- **ENGIN 451** Semiconductor Device Design, Simulation and Fabrication (3 credits)
- **ENGIN 366** Electronics II with Lab (4 credits)
- **ENGIN 471** R/F Microwave Circuits (3 credits)
- **ENGIN 435** Antenna Design (3 credits)

- **ENGIN 441** System on Chip (SoC) Design (3 credits, new course title)
- **ENGIN 442** Internet of Things (3 credits)
- **ENGIN 446** Computer Architecture Design (3 credits)
- **CS 420** Introduction to the Theory of Computation (3 credits)
- **CS 438** Applied Machine Learning (3 credits)
- **CS 444** Introduction to Operating Systems (3 credits)
- **CS 445** Real-Time Systems (3 credits)
- **CS 446** Introduction to Internetworking (3 credits)
- **CS 451** Compilers (3 credits)
- **CS 470** Introduction to Artificial Intelligence (3 credits)
- **ENGIN 478** Independent Study*
- **ENGIN 480** Special Topics

*Engin 478 can be taken at most twice for a maximum of 6 credits.

6. Academic and Professional Ethics

Students at the University of Massachusetts Boston are expected to uphold high ethical standards (http://www.umb.edu/life_on_campus/policies/code). Students are obliged to refrain from acts, which they know, or under the circumstances have reason to know, would violate the academic integrity of the University. Violations of academic ethics include, but are not limited to: cheating, plagiarism, submitting the same or substantially similar work to satisfy the requirements of more than one course without permission; submitting as one's own the same or substantially similar work of another; knowingly furnishing false information to any agent of the University for inclusion in academic records; falsification, forgery, alteration, destruction or misuse of official University documents or seal.

Students should also be aware that professional societies, industries, and government agencies all have ethical codes and standards to ensure both good business practices and to maintain the public trust. The Institute of Electrical and Electronics Engineers (IEEE) represents the profession of Electrical Engineering, and students should read that organization's code of ethics published on the web site: http://www.ieee.org/web/aboutus/ethics/code.html.

7. Sample Programs

The following tables show two sample B. S. degree programs, one fulfilling the requirements in Electrical Engineering and another for Computer Engineering. These programs are for illustrative purposes only. All students are expected to plan, in consultation with their faculty advisors, programs best suited to their own situations and interests.

University of Massachusetts Boston
Electrical Engineering (EE) Curriculum
(Revised September, 2018)

Freshman Year

Fall Semester		*Spring Semester*	
Intro-D 187S Freshman seminar I	2	Intro-D 188S Freshman seminar II	2
ENGL 101 Freshman English I	3	ENGL 102 Freshman English II	3
MATH 140 Calculus I	4	MATH 141 Calculus II	4
ENGIN 104 Intro to ECE	3	PHYSIC 113 Fundamental Physics I	4
Gen Ed	3	PHYSIC 181 Physics Lab I	2
	15CH		15CH

Sophomore Year

Fall Semester		*Spring Semester*	
ENGIN 231 Circuit Analysis I	3	ENGIN 232 Circuit Analysis II	3
ENGIN 271 Circuits lab I	1	ENGIN 272 Basics Circuit lab II	1
ENGIN 211 Engineering Math	3	ENGIN 241 Digital Systems with Lab	4
MATH 242 Multivariable & Vector Cal	4	MATH 260Linear Algebra	3
PHYSIC 114 Fundamental Physics II	4	CS 109 C Programming for Engineers	3
PHYSIC 182 Physics Lab II	2	Intermediate Seminar	3
	17CH		17CH

Junior Year

Fall Semester		*Spring Semester*	
ENGIN 365 Electronics I with Lab	4	ENGIN 366 Electronics II with Lab	4
ENGIN 321 Signals and Systems	3	ENGIN 322 Probability & Random Proc.	3
ENGIN 331 Fields and Waves	3	ECE Elective (1)	3
MATH 270 Diff. Equations	3	Thematic Elective (1)	3
Gen Ed	3	Gen Ed	3
	16CH		16CH

Senior Year

Fall Semester		*Spring Semester*	
ENGIN 491 Senior Design Project I	3	ENGIN 492 Senior Design Project II	3
ECE Elective (2)	3	ECE Elective (4)	3
ECE Elective (3)	3	ECE Elect. (5) or Thematic Elect. (3)	3
Thematic Elective (2)	3	ECE Elect. (6) or Thematic Elect. (4)	3
Gen Ed	3	Gen Ed	3
	15CH		15CH

Total Degree: 126CH

University of Massachusetts Boston
Computer Engineering (CE) Curriculum
Catalog Year Spring 2021 or Earlier (Revised April 2019)

Freshman Year

Fall Semester		*Spring Semester*	
Intro-D 187S Freshman seminar I	2	Intro-D 188S Freshman seminar II	2
ENGIN 104 Intro to ECE	3	ENGL 102 Freshman English II	3
ENGL 101 Freshman English I	3	MATH 141 Calculus II	4
MATH 140 Calculus I	4	PHY 113 Fundamental Physics I	4
CS 110 Intro to Computing	4	PHY 181 Physics Lab I	2
	16CH		15CH

Sophomore Year

Fall Semester		*Spring Semester*	
ENGIN 211 Engineering Math	3	ENGIN 232 Circuit Analysis II	3
ENGIN 231 Circuit Analysis I	3	ENGIN 272 Basics Circuit Lab II	1
ENGIN 271 Circuits Lab I	1	ENGIN 241 Digital Systems with Lab	4
MATH 242 Multivariable & Vector Cal	4	CS 240 Programming in C	3
PHY 114 Fundamental Physics II	4	Intermediate Seminar	3
PHY 182 Physics Lab II	2		14CH
	17CH		

Junior Year

Fall Semester		*Spring Semester*	
ENGIN 321 Signals and Systems	3	ENGIN 322 Prob. & Random Proc.	3
ENGIN 341 Advanced Digital Design	3	MATH 260 Linear Algebra	3
ENGIN 365 Electronics I with Lab	4	CS 310 Advanced Data Str. & Alg.	3
ENGIN 346 Microcontrollers	3	CS 220 Applied Discrete Math	3
CS 210 Interm. Comp. w/ Data Str.	4	Gen Ed	3
	17CH	Gen Ed	3
			18CH

Senior Year

Fall Semester		*Spring Semester*	
ENGIN 491 Senior Design Project I	3	ENGIN 492 Senior Design Project II	3
ENGIN 446 Comp. Architecture Design	3	ECE/CS Elect. (1) or Thematic Elect. (3)	3
Thematic Elective (1)	3	ECE/CS Elect. (2) or Thematic Elect. (4)	3
Thematic Elective (2)	3	Gen Ed	3
Gen Ed	3	Gen Ed	3
	15CH		15CH

Total Degree: 127CH

University of Massachusetts Boston
Computer Engineering (CE) Curriculum
Catalog Year Fall 2021 and later (Revised August 2021)

Freshman Year

Fall Semester		*Spring Semester*	
Freshman seminar	4	ENGL 102 Freshman English II	3
ENGL 101 Freshman English I	3	MATH 141 Calculus II	4
Math 140 Calculus I	4	CS 110 Intro to Computing	4
ENGIN 104 Intro to ECE	3	PHY 113 Fundamental Physics I	4
Gen Ed	3	PHY 181 Physics Lab I	2
	17CH		17CH

Sophomore Year

Fall Semester		*Spring Semester*	
ENGIN 211 Engineering Math	3	MATH 242 Multivariable & Vector Cal	4
ENGIN 231 Circuit Analysis I	3	ENGIN 232 Circuit Analysis II	3
ENGIN 271 Circuits Lab I	1	ENGIN 272 Basics Circuit Lab II	1
CS 210 Intermediate Computing	4	CS 240 Prog in C	3
PHY 114 Fundamental Physics II	4	Intermediate Seminar	3
PHY 182 Physics Lab II	2	Gen Ed	3
	17CH		17CH

Junior Year

Fall Semester		*Spring Semester*	
ENGIN 241 Digital Systems with Lab	4	MATH 260 Linear Algebra	3
ENGIN 321 Signals and Systems	3	ENGIN 341 Advanced Digital Design	3
ENGIN 246 Comp Organization & Assembly Language	3	ENGIN 322 Prob. & Random Proc.	3
		ENGIN 346 Embedded Systems	3
ENGIN 365 Electronics I with Lab	4	CS 310 Data Structure	3
CS 220 Discrete Math	3		
	17CH		15CH

Senior Year

Fall Semester		*Spring Semester*	
ENGIN 491 Senior Design Project I	3	ENGIN 492 Senior Design Project II	3
ENGIN 342 Computer Communications and Security	3	ECE/CS Elective	3
CE Elective (ENGIN 441,442,446)	3	ECE/CS Elective	3
Gen Ed	3	ENGIN 448 Operating Systems	3
Gen Ed	3	Gen Ed	3
	15CH		15CH

Total Degree:130 CH