Chin , Aidan Date: 11/7/24

Last Name *First Name*

CompE 2021-28

Curriculum Worksheet for the Computer Engineering Classes of 2021 through 2028

First Year		Second Year		Third Year		Fourth Year	
Fall [16 or 19cr]	Spring [16 or 19cr]	Fall [18cr]	Spring [16cr]	Fall [14cr]	Spring [15-18cr]	Fall [13-15cr]	Spring [13-15cr]
ENGIN 112 Intro. to ECE [3 cr] [Note 1] **A**	ECE 122 Intro. Programming for ECE [4 cr] **A**	ECE 296C Analytical Tools for ECE [4 cr] [Note 4] **A**	ECE 213 Continuous-Time Signals & Systems [4 cr][Note 4] **D+**	ECE 322 Systems Programming [3 cr]	ECE 304 Junior Design Project [2 cr]	ECE 415 Senior Design Project I [3 cr] (GenEd-IE)	ECE 416 Senior Design Project II [3 cr]
PHYSICS 151 Gen. Physics I – Mechanics [4 cr] **A-**	PHYSICS 152 Gen. Physics II – Thermo., E&M [4 cr] **A**	ECE 202 Computational Tools for ECE [3 cr] **B+**	ECE 214 Probability & Statistics [4 cr] [Note 4] **B+**	ECE 371 ‡ Intro. to Security Engineering [4 cr]	CompE Elective [3 or 4 cr] [Notes 6 & 7]	CompE Elective [3 or 4 cr] [Notes 6 & 7]	CompE Elective [3 or 4 cr] [Notes 6 & 7]
MATH 131 Calculus I [4 cr] **CR**	MATH 132 Calculus II [4 cr] **CR**	ECE 210 Circuits & Electronics I [4 cr] **C**	ECE 231 Intro. to Embedded Systems [4 cr] **B**	ECE 331 Hardware Organization & Digital Design [3 cr]	CompE Elective [3 or 4 cr] [Notes 6 & 7]	CompE Elective [3 or 4 cr] [Notes 6 & 7]	CompE Elective [3 or 4 cr] [Notes 6 & 7]
Social World Elective [4 cr, DU or DG] [Note 2] **A**	ECE 124 Intro. Digital & Computer Systems [4 cr] **B**	ECE 241 Advanced Programming [3 cr] **B-**	COMPSCI 250 Intro. to Computation [4 cr] **B-**	ECE 303 Junior Seminar [1 cr]	CompE Elective [3 or 4 cr] [Notes 6 & 7]	Social World Elective [4 cr] [Note 2]	Social World Elective [4 cr] [Note 2]
ENGLWRIT 112 College Writing [3 cr] [take Fall or Spring of 1st year] [Note 3] **A-**		Social World Elective [4 cr] [Note 2] **A**		ENGIN 351 Writing in Engineering [3 cr] [Note 5]	Life Sciences Elective ‡ [4 cr] [Notes 5 & 7]		
FYS 191ENG First-Year Seminar in Engineering [1 cr] **A**	* Substitute three courses for ECE 201 (e.g., for math minor): * MATH 235 Linear Algebra [3 cr] **C**	2. MATH 331 Differential Equations [3 cr] **B-** 3. ECE 296C Complex Numbers [1 cr]	All three courses must be completed before attempting either ECE 213 or ECE 214 (or both).	‡ Commonwealth Honors College (CHC) and Departmental Honors (DH) students are encouraged to swap these two courses, so that they can take ENGIN 351H in the spring semester. Other rearrangements are possible as well. CHC and DH students should also enroll in ECE H371 in the fall.		5-yr B.S. / M.S. Graduate Course [3 or 4 cr] (Not used for B.S. degree) [Note 8]	5-yr B.S. / M.S. Graduate Course [3 or 4 cr] (Not used for B.S. degree) [Note 8]

The curriculum notes can be found on the reverse side of this worksheet.

UNIVERSITY OF MASSACHUSETTS AMHERST • DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

https://www.umass.edu/engineering/academics/electrical-and-computer-engineering

Updated March 2024

CompE 2021–28

— Notes for the Computer Engineering Curriculum for those entering the CompE major in Summer 2018 or later —

The abbreviations "ECE" and "E&C-ENG" are equivalent. They are both abbreviations of "Electrical and Computer Engineering". "ECE" tends to be used in departmental publications and "E&C-ENG" is used on SPIRE and on official schedules and transcripts.

Consult SPIRE (https://spire.umass.edu) for course descriptions and course requisites. It is the student's responsibility to drop any course for which they do not have all of the published requisites.

Note 1 · ENGIN 112, Intro. to ECE

In the Fall semester, choose one of the following:

ENGIN 100: Intro. to Engineering
ENGIN 110: Intro. to Chemical Engineering
ENGIN 111: Intro. to Civil & Environmental Engineering
>> ENGIN 112: Intro. to Electrical & Computer Engineering
ENGIN 113: Intro. to Mechanical & Industrial Engineering
ENGIN 114: Intro. to Biomedical Engineering

ENGIN 112 is strongly recommended for CompE and EE majors.

Note 2 · Social World Electives / Diversity Requirements

Choose four Social World Electives (**four** credits each) consisting of:

1. One Literature or Arts elective: AL or AT
2. One Historical Studies elective: HS
3. One Social and Behavioral elective: SB
4. One more elective: AL, AT, SB, I or SI

Also, choose two courses to meet the Social & Cultural Diversity requirement: one course focusing on Global diversity (e.g., AL DG) and one course focusing on United States diversity (e.g., HS DU). Most students satisfy the Diversity requirement with two of their four Social World electives. In other words, with careful planning, four courses may be used to satisfy all six graduation requirements. Choose DU or DG in the fall semester of your first year, if you don't already have credit for one.

All first-semester engineering students are required to enroll in a First-Year or Transfer Seminar, e.g., FYS 191ENG or ENGIN 291T.

Note 3 · ECE 287, Design Project

In the spring, first-year students looking for a hands-on experience may choose to take a 1-credit "Design Project". Students who are planning on taking ECE 287 in their first year will need to take ENGLWRIT 112 in the fall. Other students may take ECE 287 any fall or spring.

Note 4 · ECE 201, Analytical Tools for ECE

Students may substitute MATH 235, Linear Algebra, and MATH 331, Differential Equations, for ECE 201. A 1-credit Independent Study (ECE 296C) covering Complex Numbers is needed to fulfill the graduation requirement for ECE 201. All three courses need to be completed before taking ECE 213 and/or ECE 214.

Note 5 · Life Sciences Elective

The Life Sciences Elective can be fulfilled with any of the following five approved courses. All are 4 credits, and all fulfill the BS Gen Ed.

BIOLOGY 109: Evolution Explained (2nd sem)
BIOLOGY 110: Intro. Biology for Science Majors (2nd sem)
BIOLOGY 151: Intro. Biology I (both sem)
ENVIRSCI 101: Intro to Environmental Science (1st sem)
MICROBIO 160: Biology of Cancer and AIDS (both sem)

You may choose to take your Life Sciences elective in the fall and take ENGIN 351 in the spring. DH students should take ENGIN 351H in the spring. To use BIOLOGY 110, move this elective earlier or ask for an override, as only first-year and second-year students may self-enroll on SPIRE. Students with credit for CHEM 111 may take any BS Gen Ed.

Note 6 · CompE Electives

Choose seven CompE Electives, including at least two 500-level courses (or above) that may **not** be used to satisfy the requirements for any other major. Each is 3 credits unless otherwise indicated.

ECE 244: Modern Physics and Materials for EE (2nd sem) 4 cr
ECE 310: Circuits & Electronics II (1st sem) 4 cr
ECE 311: Intermediate Electronics (2nd sem)
ECE 315: Signal Processing Methods (1st sem)
ECE 325: Computer Networking (2nd sem)
ECE 332: Embedded Systems Lab (2nd sem)
ECE 333: Fields and Waves I (1st sem)
ECE 334: Fields and Waves II (2nd sem)
ECE 341: Algorithms for Computer Engineering (2nd sem) †
ECE 344: Fundamentals of Semiconductor Devices (1st sem)
ECE 522: Modeling and Verification of Embedded Systems (2nd sem)
ECE 523: Design Principles for Low-Power Embed. Comp. Sys. (2nd sem)
ECE 527: AI-Based Wireless Network Design (1st sem)
ECE 529: Applied ML for the Internet of Things (2nd sem)
ECE 535: Networked Embedded System Design (1st sem)
ECE 545: Network Security and Privacy (1st sem)
ECE 547: Security Engineering (2nd sem)
ECE 550: Intro. Quantum Computing (2nd sem)
ECE 558: VLSI Design Principles (1st sem) 4 cr
ECE 559: VLSI Design Project (2nd sem)
ECE 564: Communication Systems (2nd sem)
ECE 565: Digital Signal Processing and Representation (1st sem)
ECE 566: Image Processing (1st sem)
ECE 567: Synthesis and Verification of Digital Systems (1st sem)
ECE 568: Introduction to Computer Architecture (1st sem)
ECE 570: Operating Systems (2nd sem)
ECE 571: Microelectronic Fabrication (2nd sem) 4 cr
ECE 572: Optoelectronics (2nd sem)
ECE 580: Feedback Control Systems (1st sem)

Some courses shown are not offered every year. Some approved electives are not shown. All ECE 5xx and 6xx courses (except ECE 596 and 696) are allowed as well. (Instructor permission is required for 600-level courses.) Consult SPIRE to check offerings and availability.

The following courses are approved as CompE electives, but enrollment in them is not guaranteed. To request an override into a COMPSCI course, follow the posted instructions at https://www.cics.umass.edu/ugrad-education/overrides. Note that the online CICS Override Request Form changes each semester.

COMPSCI 311: Intro to Algorithms (both sem) 4 cr †
COMPSCI 348: Principles of Data Science (2nd sem)
COMPSCI 383: Artificial Intelligence (both sem)
COMPSCI 429: Software Engineering Project Management (both sem)
COMPSCI 445: Information Systems (2nd sem)
COMPSCI 446: Search Engines (1st sem)
COMPSCI 485: Applications of Natural Language Processing (both sem)
COMPSCI 501: Formal Language Theory (2nd sem)
COMPSCI 514: Algorithms for Data Science (1st sem)
COMPSCI 520: Theory and Practice of Software Engineering (both sem)
COMPSCI 532: Systems for Data Science (both sem)
COMPSCI 589: Machine Learning (both sem)

Consult SPIRE to check course offerings and availability.

† You may use either ECE 341 or COMPSCI 311 as a CompE elective.

Note 7 · Alternative Electives

To propose a different course to satisfy your Life Sciences or one of your CompE electives, fill out the ECE Alternative Elective Requests form.

Note 8 · Five-Year B.S. / M.S. in ECE

The Department of Electrical and Computer Engineering offers a five-year program through which students can obtain a Bachelor of Science degree in Electrical or Computer Engineering as well as a Master of Science (M.S.) in Electrical and Computer Engineering within a five-year time frame. You may "double-count" two 500- or 600-level electives, then complete two more that are later transferred into the M.S. program, provided at least one of the four is 600-level. More information is posted at 4+1 Accelerated Master's Degree in ECE.

Many other resources can be found at ECE Forms & Documents.

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