

McKelvey School of Engineering
BS in Systems Science & Engineering Curriculum¹
2023-2024 Catalog Year, 5/9/23

FIRST YEAR

Units	Fall Semester
3	Math 132 Calculus II [Math 131] ⁵
3	Phys 191 or 193 Physics I [Math 132] ⁶
1	Phys 191L or 193L Physics I Lab
4	ESE 105 Intro to Electrical and Systems Engineering
3	CSE 131 Intro to Computer Science
1	Engr 120 First-Year Engineering Seminar
15	Semester Total

Units	Spring Semester
3	Math 233 Calculus III [Math 132] ⁵
3	Phys 192 or 194 Physics II [Math 132, Phys 191 or 193] ⁵
1	Phys 192L or 194L Physics II Lab
3	ESE 205 Intro to Engineering Design
3	ESE 217 Differential Equations and Dynamical Systems Modeling in Engineering [ESE 105] ⁵
3	H&SS Elective ²
16	Semester Total

SECOND YEAR

Units	Fall Semester
3	ESE 2180 Linear Algebra and Component Analysis [ESE 105] ⁵
3	H&SS Elective ²
3	Chem 105 or 111A Chemistry ⁷
2	Chem 151 Lab [Chem 105 or 111A] ⁶
4	ESE 230 Intro to Circuits [Phys 192 or 194] ⁵ [ESE 217 or Math 217] ⁶
15	Semester Total

Units	Spring Semester
3	ESE 2190 Vector Calculus and Dynamics [ESE 2180, (ESE 217 or MATH 217)] ⁵
3	H&SS Elective ²
3	ESE 351 Signals and Systems ¹⁰
3	ESE 326 Probability and Statistics for Engineering [Math 233] ⁵
3	Outside concentration elective
15	Semester Total

THIRD YEAR

Units	Fall Semester
3	ESE 4031 Optimization for Engineered Planning, Decisions and Operations ³ or ESE 415 Optimization [Multivariable calculus, Linear algebra] ⁵
3	ESE 441 Control Systems [CSE 131 and either ESE 351 or MEMS 431] ⁵
3	Systems science and engineering electives with engineering topics units ⁸
3	Outside concentration elective
3	H&SS Elective ²
15	Semester Total

Units	Spring Semester
3	Required systems lab ⁴
3	Engr 310 Technical Writing [Junior] ⁶
6	Systems science and engineering electives with engineering topics units ⁸
3	H&SS Elective ²
15	Semester Total

FOURTH YEAR

Units	Fall Semester
3	ESE 499 Systems Science and Engineering Capstone Design Project
3	H&SS Elective ²
1	Engr 4501 Engineering Ethics and Sustainability
3	Systems science and engineering electives with engineering topics units ⁸
3	Outside concentration elective
3	Elective systems lab ⁹
16	Semester Total

Units	Spring Semester
3	Outside concentration elective
10	Free electives
13	Semester Total

Bolded courses are typically taught fall and spring semesters.

¹ A minimum of 120 units (an average course load of 15 units per semester) are required for the BSSSE degree

² A minimum of 18 units of H&SS are required

³ Prerequisites: ESE 105 (or both CSE 131 and Math 309), Math 217 and ESE 326

⁴ ESE 4480 Control Systems Design Lab [ESE 351 or MEMS 431]⁵ [ESE 441]⁶ or ESE 4481 Autonomous Aerial Vehicle Control Lab [ESE 441]⁵

⁵ Pre-requisite

⁶ Co-requisite

⁷ Chem 111A recommended, but Chem 105 accepted

⁸ At least 12 units of SSE electives. A total of 45 topics units required for the BSSSE degree. For more information regarding electives and topics units, visit [here](#).

⁹ Select one elective lab: ESE 465 Digital Systems Lab or ESE 488 Signals and Communication Laboratory or ESE 449 Digital Process Control Laboratory

¹⁰ Prerequisites: Physics 192 or 194, ESE 217, ESE 2180, and ESE 105 or ESE 230