

**ELECTRICAL ENGINEERING PROGRAM: FIRST AND SECOND YEARS
EARLY-STARTING STUDENTS**

	SEMESTER I	SEMESTER II	SEMESTER III	SEMESTER IV
MATHEMATICS	MATH UN1101 (3)	MATH UN1102 (3)	APMA E2000 (4) and E2001 (0) either semester and APMA E2101 (3)¹	
PHYSICS (three sequences, choose one)	UN1401 (3) —————→ UN1601 (3.5) —————→ UN2801 (4.5) —————→	UN1402 (3) UN1602 (3.5) UN2802 (4.5)		
CHEMISTRY	one-semester lecture (3–4) UN1403 or UN1404 or UN2045 or UN1604			
CORE REQUIRED COURSES	ELEN E1201 (3.5) Introduction to electrical engineering (either semester)		ELEN E3201 (3.5) Circuit analysis ELEN E3801 (3.5) Signals and systems	ELEN E3331 (3) Electronic circuits CSEE E3827 (3) Fund. of computer sys.
REQUIRED LABS			ELEN E3081 (1) ² Circuit analysis lab ELEN E3084 (1) ² Signals and systems lab	ELEN E3083 (1) ² Electronic circuits lab ELEN E3082 (1) ² Digital systems lab
UNIVERSITY WRITING	CC1010 (3) either semester			
REQUIRED NONTECHNICAL ELECTIVES	HUMA CC1001, COCI CC1101, or Global Core (3–4); HUMA UN1121 or UN1123 (3); HUMA CC1002, COCI CC1102, or Global Core (3–4); ECON UN1105 (4) and UN1155 recitation (0); some of these courses can be postponed to the junior or senior year, to make room for taking the above electrical engineering courses.			
COMPUTER SCIENCE	ENGI E1006 (3) either semester ³			
PHYSICAL EDUCATION	UN1001 (1)	UN1002 (1)		
THE ART OF ENGINEERING	ENGI E1102 (4) either semester			

¹ APMA E2101 may be replaced by MATH UN2030 (formerly MATH E1210) and either APMA E3101 or MATH UN2010.

² If possible, these labs should be taken along with their corresponding lecture courses.

³ ENGI E1006 may not be offered every semester. See ee.columbia.edu for more discussion about the Computer Science sequences.

**ELECTRICAL ENGINEERING: THIRD AND FOURTH YEARS
EARLY-STARTING STUDENTS**

		SEMESTER V	SEMESTER VI	SEMESTER VII	SEMESTER VIII
PHYSICS (sequences continued)		UN1403 (3) UN2601 (3.5) Lab W3081 (2)	Lab UN1494 (3) ¹		
EE CORE REQUIRED COURSES		ELEN E3106 (3.5) Solid-state devices and materials	ELEN E3401 (4) Electromagnetics ELEN E3701 (3) ² Intro. to communication systems or CSEE W4119 (3) ² Computer networks		
EE REQUIRED LABS				ELEN E3043 (3) Solid state, microwave, and fiber optics lab ELEN E3399 (1) EE practice	ELEN E3390 (3) ³ Capstone design course
OTHER REQUIRED COURSES		IEOR E3658 or STAT GU4203 ⁴ ; and COMS W3136 (or W3134 or W3137) ⁵ (some of these courses are not offered both semesters. Students with an adequate background can take some of these courses in the sophomore year)			
ELECTIVES	EE DEPTH TECH	At least two technical electives in one depth area. The four depth areas are (a) photonics, solid-state devices, and electromagnetics; (b) circuits and electronics; (c) signals and systems; and (d) communications and networking (for details, see ee.columbia.edu)			
	BREADTH TECH	(at least 6 points total) At least two technical electives outside the chosen depth area; must be courses with significant engineering content (see ee.columbia.edu)			
	OTHER TECH	Additional technical electives (consisting of more depth or breadth courses, or further options listed at ee.columbia.edu/ee-undergraduate-program) as required to bring the total points of technical electives to 18 ⁶			
	NONTECH	Complete 27-point requirement; see page 9 (27-Point Nontechnical Requirement)			
TOTAL POINTS⁷		16.5	17	16	18

¹ Chemistry lab (CHEM UN1500) may be substituted for physics lab, although this is not generally recommended.

² These courses can be taken in the sophomore year if the prerequisites/corequisites are satisfied.

³ The capstone design course provides ELEN majors with a "culminating design experience." As such, it should be taken near the end of the program and involve a project that draws on material from a range of courses. If special arrangements are made in ELEN E3399, it is possible to use courses such as ELEN E3998, E4350, E4998, EECS E4340, or CSEE W4840 in place of ELEN E3390.

⁴ SIEO W3600 and STAT GU4001 cannot generally be used to replace IEOR E3658 or STAT GU4203.

⁵ Students who plan to minor in Computer Science should choose COMS W3134 or W3137.

⁶ The total points of technical electives is reduced to 15 if APMA E2101 has been replaced by MATH UN2030 (formerly MATH E1210) and either APMA E3101 or MATH UN2010. Combined-plan students with good grades in separate, advanced courses in linear algebra and ODEs can also apply for this waiver, but the courses must have been at an advanced level for this to be considered.

⁷ "Total points" assumes that 20 points of nontechnical electives and other courses are included.

**ELECTRICAL ENGINEERING PROGRAM: FIRST AND SECOND YEARS
LATE-STARTING STUDENTS**

	SEMESTER I	SEMESTER II	SEMESTER III	SEMESTER IV
MATHEMATICS	MATH UN1101(3)	MATH UN1102 (3)	APMA E2000 (4) and E2001 (0) either semester	
				and APMA E2101 (3) ¹
PHYSICS (three sequences, choose one)	UN1401 (3) UN1601 (3.5) UN2801 (4.5)	UN1402 (3) UN1602 (3.5) UN2802 (4.5)	UN1403 (3) UN2601 (3.5) Lab UN3081 (2)	Lab UN1494 (3) ²
CHEMISTRY	one-semester lecture (3–4) UN1403 or UN1404 or UN2045 or UN1604			
ELECTRICAL ENGINEERING	ELEN E1201 (3.5) either semester ³			
UNIVERSITY WRITING	CC1010 (3) either semester			
REQUIRED NONTECHNICAL ELECTIVES			HUMA CC1001, COCI CC1101, or Global Core (3–4) HUMA UN1121 or UN1123 (3)	HUMA CC1002, COCI CC1102, or Global Core (3–4) ECON UN1105 (4) and UN1155 recitation (0)
COMPUTER SCIENCE	ENGI E1006 (3) any semester ⁴			
PHYSICAL EDUCATION	UN1001 (1)	UN1002 (1)		
THE ART OF ENGINEERING	ENGI E1102 (4) either semester			

¹ APMA E2101 may be replaced by MATH UN2030 (formerly MATH E1210) and either APMA E3101 or MATH UN2010.

² Chemistry lab (CHEM UN1500) may be substituted for physics lab, although this is not generally recommended.

³ Transfer students and 3-2 Combined Plan students who have not taken ELEN E1201 prior to the junior year are expected to have taken a roughly equivalent course when they start ELEN E3201.

⁴ ENGI E1006 may not be offered every semester. See ee.columbia.edu for more discussion about the Computer Science sequences.

**ELECTRICAL ENGINEERING: THIRD AND FOURTH YEARS
LATE-STARTING STUDENTS**

		SEMESTER V	SEMESTER VI	SEMESTER VII	SEMESTER VIII
EE CORE REQUIRED COURSES		ELEN E3106 (3.5) Solid-state devices and materials ELEN E3201 (3.5) Circuit analysis ELEN E3801 (3.5) Signals and systems	CSEE W3827(3) Fund. of computer sys. ELEN E3331 (3) Electronic circuits ELEN E3401 (4) Electromagnetics ELEN E3701 (3) Intro. to communication systems or CSEE W4119 (3) Computer networks		
EE REQUIRED LABS		ELEN E3081 (1) ¹ Circuit analysis lab ELEN E3084 (1) ¹ Signals and systems lab	ELEN E3083 (1) ¹ Electronic circuits lab ELEN E3082 (1) ¹ Digital systems lab	ELEN E3043 (3) Solid state, microwave, and fiber optics lab ELEN E3399 (1) EE practice	ELEN E3390 (3) ² Capstone design course
OTHER REQUIRED COURSES		IEOR E3658 or STAT GU4203 ³ ; and COMS W3136 (or W3134 or W3137) ⁴ (Some of these courses are <i>not</i> offered both semesters)			
ELECTIVES	EE DEPTH TECH	At least two technical electives in one depth area. The four depth areas are (a) photonics, solid-state devices, and electromagnetics; (b) circuits and electronics; (c) signals and systems; and (d) communications and networking. (For details, see ee.columbia.edu.)			
	BREADTH TECH	(at least 6 points total) At least two technical electives outside the chosen depth area; must be courses with significant engineering content (see ee.columbia.edu)			
	OTHER TECH	Additional technical electives (consisting of more depth or breadth courses, or further options listed at ee.columbia.edu/ee-undergraduate-program) as required to bring the total points of technical electives to 18 ⁵			
	NONTECH	Complete 27-point requirement; see page 9 (27-Point Nontechnical Requirement)			
TOTAL POINTS⁶		15.5	18	16	18

Note: This chart shows one possible schedule for a student who takes most of their major program in the final two years. Please refer to the previous chart for a recommended earlier start.

¹ If possible, these labs should be taken along with their corresponding lecture courses.

² The capstone design course provides ELEN majors with a "culminating design experience." As such, it should be taken near the end of the program and involve a project that draws on material from a range of courses. If special arrangements are made in ELEN E3399, it is possible to use courses such as ELEN E3998, E4350, E4998, EECS E4340, or CSEE W4840 in place of ELEN E3390.

³ SIEO W3600 and STAT GU4001 cannot generally be used to replace IEOR E3658 or STAT GU4203.

⁴ Students who plan to minor in Computer Science should choose COMS W3134 or W3137.

⁵ The total points of technical electives is reduced to 15 if APMA E2101 has been replaced by MATH UN2030 (formerly MATH E1210) and either APMA E3101 or MATH UN2010. Combined-plan students with good grades in separate, advanced courses in linear algebra and ODEs can also apply for this waiver, but the courses must have been at an advanced level for this to be considered.

⁶ "Total points" assumes that 9 points of nontechnical electives are included.