Electrical Engineering Curriculum Checklist
Class of 2023 (REVISED)

First Year							
ECSE-1010	Intro. to ECSE [6]	4			ENGR-2350	Embedded Control	4
MATH-1010	Calculus I	4			MATH-1020	Calculus II	4
CSCI-1100	Computer Science I	4			PHYS-1100	Physics I	4
	Hum., Arts or Soc. Sci. Elective	4				Science Elective	4
					ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD [1] OR Eng. Communications [1]	1
Second Year							
ECSE-2610	Computer Comp. & Operations	4			ECSE-2010	Electric Circuits [8]	4
PHYS-1200	Physics II	4			ECSE-2500	Engineering Probability [8]	3
MATH-2400	Intro. to Differential Eqns.	4			MATH-2010	Multivariable Calc & Matrix Algebra	4
	Hum., Arts or Soc. Sci. El.	4				Hum., Arts or Soc. Sci. El.	4
ARCH SEMESTER		**Third Year**				**Fall or Spring**	
ECSE-2110	Electrical Energy Systems	3			ECSE-2050	Intro. to Electronics [8]	4
ENGR-2050	Intro. to Eng. Design	4			ECSE-2100	Fields & Waves I [8]	4
STSS-4100	Professional Development II [1,3]	2			ECSE-2410	Signals & Systems [8]	3
	Hum., Arts or Soc. Sci. El.	4			ECSE-2900	ECSE Enrichment Seminar	1
	Free Elective [2]	3-4				Math/Science Elective[7]	4
Fourth Year							
ECSE-4900	Multidisc. Capstone Design [1]	3				Restricted Elective [1,4,5]	3
ENGR-4010	Professional Development III [1]	1				Free Elective [1,2]	3-4
ECSE-2210	Microelectronics Tech. [8]	3				Free Elective [1,2]	3-4
	Lab Elective [1,4]	3				Free Elective (if needed)[2]	3-4
	Restricted Elective [1,4,5]	3				Hum., Arts or Soc. Sci. Elective	4
	Technical Elective [1,4,5]	3-4					

1 May be taken either term.
2 The free electives must total to at least 12 credits.
3 For a list of courses that satisfy the Professional Development – Technical Issues & Solution requirement refer to the link "Professional Development Courses" on the Registrar's "Academic Planning" web page. It should be completed before the capstone design course.
4 It is recommended that students use electives to form a concentration. See the ECSE Web page for concentration listings.
5 No more than one Independent Study course may be used when satisfying the combined Technical and Restricted Elective requirements.
6 May be replaced with ENGR-1100 Introduction to Engineering Analysis.
7 Students who wish to take ENGR-1600 Materials Science as their Math/Science Elective must take CHEM-1100.
8 Offered in Fall and Spring terms annually. Students should take the courses once the prerequisites are met.

128 credits minimum

RESTRICTED ELECTIVE
Any 3 or 4 credit hour course with the designation ECSE-4xxx or ECSE-6xxx.

TECHNICAL ELECTIVE
Any 3- or 4-credit-hour course in engineering, mathematics, or science at the 4000 level or higher.

LAB ELECTIVES
ECSE 4090 Mechatronics
ECSE-4130 Electric Power Eng. Lab
ECSE-4220 VLSI Design
ECSE-4760 Real-Time Cntrl & Comm.
ECSE-4770 Cptr H'ware Design
ECSE-4790 Microprocessor Systems
ENGR-4710 Manufacturing Proc & Sys Lab I

SCIENCE ELECTIVE
CHEM-1100 Chemistry I
BIOL-1010/1015 Introduction to Biology + Lab
BIOL-2120 Cell and Molecular Bio.

MATH/SCIENCE ELECTIVE
A 4-credit-hour course (or a 3-credit-hour course with a 1-credit-hour laboratory) in Science (ASTR, BIOL, CHEM, ERTH, PHYS) or Mathematics (MATH, MATP). An independent Study course cannot be used to satisfy this requirement.

Computer and Systems Engineering Curriculum Checklist
Class of 2023 (REVISED)

First Year							
ECSE-1010	Intro. to ECSE[7]	4			ECSE-2610	Computer Comp. & Operations	4
CSCI-1100	Computer Science I	4			CSCI-1200	Data Structures	4
MATH-1010	Calculus I	4			MATH-1020	Calculus II	4
ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD[1] OR Eng. Communications[1]	1			PHYS-1100	Physics I	4
	Hum., Arts or Soc. Sci. Elective	4					
Second Year							
ENGR-2350	Embedded Control	4			ECSE-2010	Electric Circuits [8]	4
CSCI-2200	Foundations of Comp. Sci.	4			CSCI-2300	Intro to Algorithms	4
MATH-2400	Intro. to Differential Equations	4				Science Elective	4
PHYS-1200	Physics II	4				Hum., Arts or Soc. Sci. Elective	4
Arch Semester		**Third Year**			**Fall or Spring**		
ECSE-2660	Cptr Arch, Nets, & Op Sys	4			ECSE-2050	Intro. to Electronics [8]	4
ENGR-2050	Intro. to Eng. Design	4			ECSE-2410	Signals & Systems [8]	3
MATH-2010	Multivar Calc & Matrix Alg.	4			ECSE-2500	Engineering Probability [8]	3
	Hum., Arts or Soc. Sci. Elective	4			ECSE-2900	Enrichment Seminar	1
					STSS-4100	Professional Development II[1,3,4]	2
						Hum., Arts or Soc. Sci. Elective	4
Fourth Year							
ENGR-4010	Professional Development III[1]	1			ECSE-4900	Multidisc. Capstone Design[1]	3
	Computer Eng Elective[1,4]	3-4				Free Elective[2]	3-4
	Restricted Elective[1,5,6]	3-4				Free Elective[2]	3-4
	Restricted Elective[1,5,6]	3-4				Free Elective (if needed) [2]	3-4
	Technical Elective[1,5,6]	3-4				Hum., Arts or Soc. Sci. Elective	4
	Free Elective[2]	3-4					

1 May be taken either term.
2 The free electives must total at least 12 credits.
3 For a list of courses that satisfy the Professional Development – Technical Issues & Solution requirement refer to the link "Professional Development Courses" on the Registrar's "Academic Planning" web page. It should be completed before the capstone design course.
4 May be taken in the third year.
5 It is recommended that students use electives to form a concentration. See the ECSE Web page for concentration listings.
6 No more than one Independent Study course may be used when satisfying the combined Technical and Restricted Elective requirements.
7 May be replaced with ENGR 1100 Introduction to Engineering Analysis.
8 Offered in Fall and Spring terms annually. Students should take the courses once the prerequisites are met.

130 credits minimum

RESTRICTED ELECTIVE
Any 3 or 4 credit hour course with the designation ECSE-4xxx or ECSE-6xxx or CSCI-4xxx or CSCI-6xxx.

TECHNICAL ELECTIVE
Any 3- or 4-credit-hour course in engineering, mathematics, or science at the 4000 level or higher.

COMPUTER ENGINEERING ELECTIVES
ECSE-4670 Computer Comm. Networks
ECSE-4740 Parallel Computing
ECSE-4750 Computer Graphics
ECSE-4770 Computer Hardware Design
ECSE-4790 Microprocessor Systems
CSCI-4380 Database Systems
CSCI-4440 Software Design & Doc

SCIENCE ELECTIVE
BIOL-1010/1015 Introduction to Biology +Lab
BIOL-2120 Intro to Cell and Molecular Biology
CHEM-1100 Chemistry I

EE and CSE Dual Major Curriculum Checklist **Class of 2023/2024**

Fall					First Year	Spring			
ECSE-1010	Intro. to ECSE[5]	4			ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD[1] OR Eng. Communications[1]	1		
MATH-1010	Calculus I	4			MATH-1020	Calculus II	4		
CSCI-1100	Computer Science I	4			PHYS-1100	Physics I	4		
IHSS-XXXX	Hum., Arts or Soc. Sci. El.[6]	4			CSCI-1200	Data Structures	4		
						Hum., Arts or Soc. Sci. El.[6]	4		
Fall					Second Year	Spring			
ENGR-2350	Embedded Control	4			ECSE-2610	Cptr. Comp & Operations	4		
MATH-2400	Intro. to Differential Eqns.	4			ECSE-2010	Electric Circuits	4		
CSCI-2200	Foundations of Comp. Sci.	4			PHYS-1200	Science Elective[4]	4		
PHYS-1200	Physics II	4			CSCI-2300	Intro to Algorithms	4		
Summer Arch Semester					Third Year	Spring or Fall			
ENGR-2050	Intro. to Eng. Design	4			ECSE-2900	ECSE Enrichment Seminar	1		
ECSE-2660	Cptr Arch, Nets, & Op Sys	4			ECSE-2050	Intro. to Electronics	4		
	Math/Science Elective[1,4]	4			ECSE-2100	Fields & Waves I	4		
MATH-2010	Multivar Calc & Matrix Alg	4			ECSE-2410	Signals & Systems	3		
	Hum., Arts or Soc. Sci. El.	4			ECSE-2500	Engineering Probability	3		
					ECSE-2110	Electrical Energy Systems	3		
Fall					Fourth Year	Spring			
ENGR-4010	Professional Devel. III[1]	1				Professional Devel. II[1,2]	2		
ECSE-2210	Microelectronics Tech.	3			ECSE-4900	Multidisc. Capstone Design[1]	3		
	Computer Eng Elective[1]	3-4				Restricted Elective[1,3]	3-4		
	Lab Elective[1,3]	3-4				Restricted Elective[1,3]	3-4		
	Technical Elective[1,3]	3-4				Hum., Arts or Soc. Sci. El.	4		
	Hum., Arts or Soc. Sci. El.	4							

1. May be taken either term.
2. May be taken in the third year
3. It is recommended that students use electives to form a concentration. See the ECSE web page for concentration listings.
4. Students who wish to take ENGR-1600 Materials Science as their Math/Science Elective must take CHEM-1100.
5. May be replaced with ENGR-1100 Introduction to Engineering Analysis.
6. HASS Inquiry must be taken in first year; suggested that HASS Communication Intensive be taken in first 3 semesters.

135 credits minimum

RESTRICTED ELECTIVE
Any 3 or 4 credit hour course with the designation ECSE-4xxx, ECSE-6xxx, CSCI-4xxx, or CSCI-6xxx.

TECHNICAL ELECTIVE

Any 3 or 4 credit hour course in engineering, mathematics, or science at the 4000 level or higher.

MATH/SCIENCE ELECTIVE

A 4-credit-hour course (or a 3-credit- hour course with a 1-credit-hour laboratory) in Science (ASTR, BIOL, CHEM, ERTH, PHYS) or Mathematics (MATH, MATP). An independent Study course cannot be used to satisfy this requirement.

COMPUTER ENGINEERING ELECTIVES

ECSE 4740 - Applied Parallel Computing for Engineers
ECSE-4670 Comp. Comm. Networks
ECSE-4750 Computer Graphics
ECSE-4790 Microprocessor Systems
CSCI-4380 Database Systems
CSCI-4440 Software Dsg & Doc

LAB ELECTIVES

ENGR-4710 Adv. Manufacturing Lab I
ECSE 4090 Mechatronics
ECSE-4160 Electric Power Eng. Lab
ECSE-4220 VLSI Design
ECSE-4760 Real-Time Cntrl & Comm.
ECSE-4770 Cptr H'ware Design
ECSE-4790 Microprocessor Systems

SCIENCE ELECTIVE

CHEM-1100 Chemistry I
BIOL-1010 Introduction to Biology BIOL-2120 Cell and Molecular Bio.

CSE and Computer Science Dual Major Curriculum Checklist Class of 2023/2024

**Please note using a template form a different class year other than your own may result in graduation delays. Please discuss all templates with your advisors in each department.

	First Year						
CSCI-1100	Computer Science I	4		CSCI-1200	Data Structures	4	
ECSE-1010	Intro. to ECSE[3]	4		MATH-1020	Calculus II	4	
ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD[1] OR Eng. Communications[1]	1		BIOL-1010	Intro to Biology	3	
MATH-1010	Calculus I	4		BIOL-1015	Intro to Biology Lab	1	
IHSS-XXXX	Hum., Arts or Soc. Sci. Elective[7]	4			Hum., Arts or Soc. Sci. Elective[7]	4	
	Second Year						
CSCI-2200	Foundations of Comp. Sci.	4		CSCI-2300	Intro to Algorithms	4	
ECSE-2610	Cptr. Comp. & Operations	4		ECSE-2660	Cptr Arch, Nets, & Op Sys	4	
ENGR-2350	Embedded Control	4		MATH-2400	Intro. to Differential Equations	4	
PHYS-1100	Physics I	4		PHYS-1200	Physics II	4	
				ECSE-2900	ECSE Enrichment Seminar	1	
	Summer Arch Semester		**Third Year**		**Fall or Spring**		
ECSE-2010	Electric Circuits	4		ECSE-2410	Signals & Systems	3	
ENGR-2050	Intro. to Eng. Design	4		MATH-2010	Multivar Calc & Matrix Alg.	4	
CSCI-2600	Principles of Software[5]	4		ECSE-2500	Engineering Probability	3	
CSCI-4210	Operating Systems[5]	4		ECSE-2050	Introduction to Electronics	4	
					Hum., Arts or Soc. Sci. Elective	4	
	Fourth Year						
ENGR-4010	Professional Development III	1			Professional Development II[1,2]	2	
CSCI-4430	Programming Languages[4]	4		ECSE-4900	Multidisc. Capstone Design	3	
	CSCI Option/Capstone[1]	3-4			CSCI Option/Capstone[1]	3-4	
	CSCI Option/Capstone[1]	3-4			CSCI Option/Capstone[1]	3-4	
	Hum., Arts or Soc. Sci. Elective	4			Hum., Arts or Soc. Sci. Elective	4	

[1] May be taken either term.
[2] May be taken in the third year.
[3] May be replaced with ENGR-1100 Introduction to Engineering Analysis.
[4] This course is offered exclusively in the fall semester.
[5] Only offered ARCH and Spring semesters
***CSE must be your first named major. Otherwise an additional 2 credit hours of H&SS are required. 129 credits minimum**
[7] HASS Inquiry must be taken in first year; suggested that HASS Communication Intensive be taken in first 3 semesters.

CSCI OPTION
Four courses of three or four credits at the 4000 or 6000 level. For this purpose, courses in the series CSCI 4xxx, CSCI 6xxx, ECSE 46xx, and ECSE 47xx may be used, excluding ECSE 4630, ECSE 4640, ECSE 4720, and reading and independent study courses. The Pass/No Credit option cannot be used for these courses.

CSCI CAPSTONE
A culminating experience selected from one or two categories below (note that the P/NC option cannot be used for any of the courses below):

1. The research-focused capstone consists of a 4-credit Undergraduate Research Project (URP) supervised by a CSCI (or CSCI- affiliated) faculty member. Students must register for these credits (i.e. CSCI 4941) in one of their final two undergrad semesters (not including co-op). Further, the student is required to have taken a 4000 level course or an earlier 4000 level URP with the faculty supervisor. The student will complete a formal written research project report or paper approved by the faculty supervisor. For the URP, the student must either (a) complete a formal written research project report or paper or (b) write and present a conference-quality presentation / poster approved by the faculty supervisor. If students meet the above requirements, they are also encouraged to consider participating in the Honors Research Thesis Program for Undergraduates. Students must include the following information in their URP proposal: (a) Description of the research project, (b) Relevance & significance of the research, (c) Milestones & timeline of the research, with contingency plans if milestones are not met, (d) Description of the project deliverables (i.e., a written document, program developed, etc.)

2. The coursework concentration capstone consists of three 4000 or 6000 level CSCI (or CSCI cross listed) courses in one of the following topic areas: (a) Theory & Algorithms, (b) Systems & Software, (c) Artificial Intelligence & Data, (d) Vision, Graphics, Robotics & Games
All 4000 and 6000 level CSCI catalog courses that are not part of the required undergraduate core are assigned to one or more topic areas. Similarly, all 4000 and 6000 level special topics courses (i.e., with 496x, 497x, 696x, 697x course numbers) are assigned to one or more topic areas when the given course is listed. Note that the courses taken also count as Computer Science (CS) Option courses

EE and Applied Physics Dual Major Curriculum Checklist **Class of 2023/2024**

	First Year						
CSCI-1100	Computer Science I	4		ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD [1] OR Eng. Communications [1]	1	
MATH-1010	Calculus I	4			Chemistry I	4	
ECSE-1010	Intro. to ECSE [3]	4		MATH-1020	Calculus II	4	
PHYS-1150	Physics I Honors	4		PHYS-1250	Physics II Honors	4	
IHSS-XXXX	Hum., Arts or Soc. Sci. Elective[5]	4			Hum., Arts or Soc. Sci. Elective[5]	4	
	Second Year						
ENGR-2050	Intro. to Eng. Design	4		ENGR-2350	Embedded Control	4	
MATH-2400	Intro. to Differential Eqns.	4		ECSE-2010	Electric Circuits	4	
BIOL-1010	Intro to Biology[1]	4		ECSE-2500	Engineering Probability	4	
PHYS-2210	Quantum Physics I	4			Hum., Arts or Soc. Sci. Elective	4	
ECSE-2610	Cptr. Comp. & Operations	4					
SUMMER ARCH SEMESTER			**Third Year**		**Fall or Spring**		
				ECSE-2900	ECSE Enrichment Seminar	1	
ECSE-2110	Electrical Energy Systems	3		MATH-4600	Advanced Calculus[4]	4	
ENGR-4010	Professional Devel. III [1]	1		ECSE-2050	Intro. to Electronics	4	
MATH-2010	Multivariable Calc & Matrix Algebra	4		ECSE-2410	Signals and Systems	3	
	Hum., Arts or Soc. Sci. Elective	4		PHYS-2220	Quantum Physics II[6]	4	
	Hum., Arts or Soc. Sci. Elective	4					
	Fourth Year						
					Professional Devel. II[1,2]	2	
PHYS-4210	Electromagnetic Theory	4			Microelectronics Elective[1]	3-4	
ECSE-2210	Microelectronics Tech.	3		ECSE-4900	Multidisc. Capstone Dsgn[1]	3	
PHYS-4330	Theoretical Mechanics	4		PHYS-4420	Thermody. & Stat. Mechanics	4	
PHYS-2350	Experimental Physics	4			EE Restricted Elective	3	
ECSE-4220	VLSI Design	3					

[1] May be taken either term; HASS Inquiry must be taken in first year; HASS Communication Intensive must be taken in first 3 semesters.
[2] May be taken in the third year.
[3] May be replaced with ENGR-1100 Introduction to Engineering Analysis.
[4] May be replaced with other 4000-level math classes upon approval of degree coordinator.
[5] HASS Inquiry must be taken in first year; suggested that HASS Communication Intensive be taken in first 3 semesters.
[6] Only offered in Spring Term

137 credits minimum

***EE must be your first named major. Otherwise an additional 2 credit hours of H&SS are required.**

MICROELECTRONICS ELECTIVE
ECSE-4080 Semiconductor Pwr Electronics
ECSE-4250 Int. Ckt. Process & Design
ECSE-4720 Solid-State Physics
ECSE 4370: Introduction to Optoelectronics Technology

EE RESTRICTED ELECTIVE

Any 3 or 4 credit hour course with the designation ECSE 4xxx or ECSE 6xxx

Electrical Engineering and Math Dual Major Curriculum Checklist

	First Year							
CSCI-1100	Computer Science I	4			ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD [1] OR Eng. Communications [1]	1	
ECSE-1010	Intro. to ECSE [6]	4			MATH-1020	Calculus II	4	
MATH-1010	Calculus I	4			PHYS-1100	Physics I	4	
IHSS-####	Hum., Arts or Soc. Sci. Elective[1,8]	4			ENGR-2350	Embedded Control	4	
					BIOL-1010/1015	Introduction to Biology + Lab	4	
	Second Year							
ECSE-2610	Computer Components & Operations	4			ECSE-2010	Electric Circuits	4	
MATH-2400	Intro. to Differential Eqns.	4			ECSE-2500	Engineering Probability	4	
PHYS-1200	Physics II	4				Hum., Arts or Soc. Sci. Elective[1]	4	
MATH-2010	Multivariable Calc & Matrix Algebra	4			MATH-4090	Foundations of Analysis[7]	4	
ARCH SEMESTER			**Third Year**		**Fall or Spring**			
ECSE-2110	Electrical Energy Systems	4			ECSE-2100	Fields & Waves I	4	
ENGR-2050	Intro to Engineering Design	4			ECSE-2050	Intro to Electronics	4	
	Hum., Arts or Soc. Sci. Elective[1]	4			ECSE-2410	Signals and Systems	3	
MATH-4100	Linear Algebra[7]	4			ECSE-2900	ECSE Enrichment Seminar	1	
						MATH Capstone I[7]	4	
					STSS-4100	Professional Development II [1,3]	2	
	Fourth Year							
ECSE-2210	Microelectronics Tech	3				Restricted Elective [1,4,5]	3	
ENGR-4010	Professional Development III [1]	1				MATH Option II[7]	4	
	Lab Elective [1,4]	3				Restricted Elective [1,4,5]	3	
	MATH Capstone II[7]	4				Hum., Arts or Soc. Sci. Elective	4	
	Hum., Arts or Soc. Sci. Elective	4				MATH Capstone III[7]	4	
	MATH Option I[7]	4			ECSE-4900	Multidisc. Capstone Design	3	

1 May be taken either term.
2 The free electives must total to at least 12 credits.
3 This course will be fulfilled from a list published at the start of each semester.
4 It is recommended that students use electives to form a concentration. See the ECSE Web page for concentration listings.
5 No more than one Independent Study course may be used to when satisfying the Restricted Elective requirements.
6 May be replaced with ENGR-1100 Introduction to Engineering Analysis.
7 The sequencing of 4000-level MATH courses is very flexible. Students should consult with their MATH advisor before spring of sophomore year for suggestions on course sequencing.
8 HASS Inquiry must be taken in first year; suggested that HASS Communication Intensive be taken in first 3 semesters.

RESTRICTED ELECTIVE
Any 3 or 4 credit hour course with the designation ECSE-4xxx or ECSE-6xxx.

MATH OPTION
Any MATH/MATP course at the 4000 level or above. A maximum of one independent study or URP can be used for this requirement.

MATH CAPSTONE TOPIC AREAS AND COURSES (PICK 3 IN SAME AREA)
Mathematics: MATH 4010, MATH 4020, MATH 4040, MATH 4120, MATH 4200, MATH 4210, MATH 4300, MATH 4950
Applied Mathematics: MATH 4300, MATH 4400, MATH 4500, MATH 4600, MATH 4700, MATH 4720, MATH 4800, MATH 4950
Mathematics of Computation: MATH 4800, MATH 4820, MATH 4840, MATH 4950, MATP 4400, MATP 4820
Mathematics of Operations Research: MATH 4950, MATP 4400, MATP 4600, MATP 4620, MATP 4700, MATP 4820

LAB ELECTIVES
ECSE 4090 Mechatronics
ECSE-4130 Electric Power Eng. Lab
ECSE-4220 VLSI Design
ECSE-4760 Real-Time Cntrl & Comm.
ECSE-4770 Cptr H'ware Design
ECSE-4790 Microprocessor Systems
ENGR-4710 Adv. Manufacturing Lab I