Electrical Engineering Curriculum Checklist — Class of 2022

	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				Science Elective [5]	4	
ECSE-1010	Intro. to ECSE [6]	4			MATH-1020	Calculus II	4	
	Hum., Arts or Soc. Sci. Elective	4			PHYS-1100	Physics I	4	
						Hum., Arts or Soc. Sci. Elective	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	
PHYS-1200	Physics II	4			ECSE-2610	Cptr. Comp. & Operations	4	
	Hum., Arts or Soc. Sci. El.	4			MATH-2010	Multivariable Calc & Matrix Algebra	4	
SUMMER ARCH SEMESTER			**Third Year**		**Fall or Spring**			
ECSE-2050	Intro. to Electronics	4			ECSE-2900	ECSE Enrichment Seminar	1	
ECSE-2410	Signals & Systems	3			ECSE-2100	Fields & Waves I	4	
ECSE-2500	Engineering Probability	3			ECSE-2210	Microelectronics Tech.	3	
	Professional Development II [3]	2			ECSE-2110	Electrical Energy Systems	3	
	Free Elective [2]	3-4				Math/Science Elective	4	
	Fourth Year							
ENGR-4010	Professional Development III [1]	1				Restricted Elective [1,4,5]	3	
ECSE-4900	Multidisc. Capstone Design [1]	3				Restricted Elective [1,4,5]	3	
	Lab Elective [1,4]	3-4				Free Elective [1,2]	3-4	
	Technical Elective [1,4,5]	3-4				Free Elective (if needed) [2]	3-4	
	Free Elective [1,2]	3-4				Hum., Arts or Soc. Sci. Elective	4	
	Hum., Arts or Soc. Sci. Elective	4						

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 combined Technical and Restricted Elective requirements.
6 May be replaced with ENGR-1100 Introduction to Engineering Analysis

128 credits minimum

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

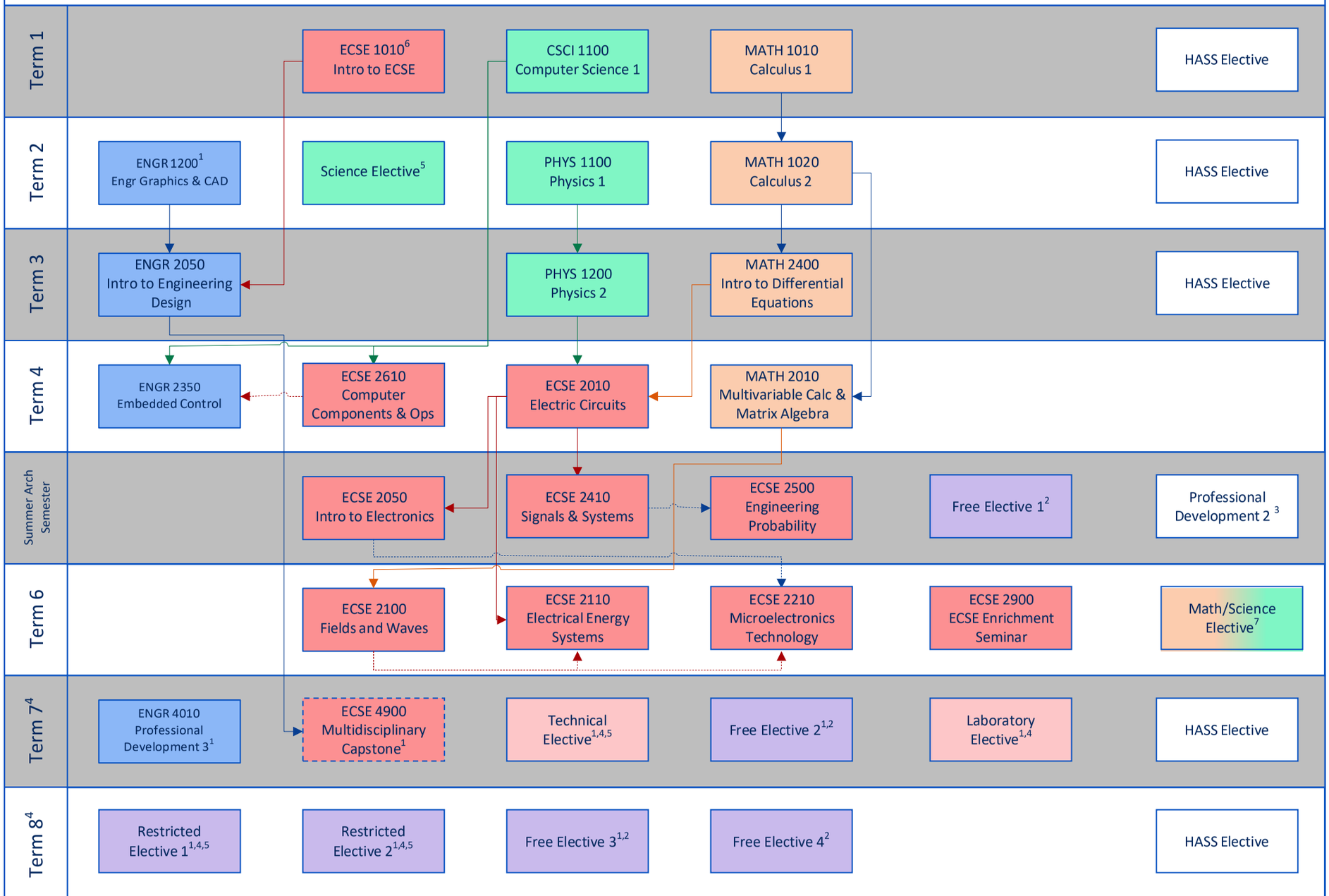
TECHNICAL ELECTIVE
Any 3- or 4-credit-hour course in engineering, mathematics, or science at the 4000 level or higher.

LAB ELECTIVES
ENGR-4710 Adv. Manufacturing Lab I
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

SCIENCE ELECTIVE
CHEM-1100 Chemistry I
BIOL-1010 Introduction to Biology
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.

Electrical Engineering Curriculum and Schedule Class of 2022



Key

10-14 Core Engineering Credits	32-36 Electrical Core Credits
16-20 Science Credits	6-8 Electrical Elective Credits
16-20 Mathematics Credits	18-24 Restricted and Free Electives
22 Humanities and Social Sciences Credits	**128 Total Credit Hours**

Pre-Requisite → Co-Requisite ⇢ Writing Intensive Course

1. May be taken either term.
2. The free electives must total at least 12 credits.
3. This course will be fulfilled from a list published either in the academic catalog or at the start of each semester.
4. Students can 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.

Computer and Systems Engineering Curriculum Checklist Class of 2022

	First Year						
CSCI-1100	Computer Science I	4		CSCI-1200	Data Structures	4	
ECSE-1010	Intro. to ECSE[7]	4		MATH-1020	Calculus II	4	
ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD[1] OR Eng. Communications[1]	1			Science Elective	4	
MATH-1010	Calculus I	4			Hum., Arts or Soc. Sci. Elective	4	
	Hum., Arts or Soc. Sci. Elective	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	
	Summer Arch Semester		**Third Year**		**Fall or Spring**		
ECSE-2010	Electric Circuits	4		ECSE-2050	Intro. to Electronics	4	
ENGR-2050	Intro. to Eng. Design	4		ECSE-2410	Signals & Systems	3	
MATH-2010	Multivar Calc & Matrix Alg.	4		ECSE-2500	Engineering Probability	3	
	Hum., Arts or Soc. Sci. Elective	4			Free Elective[2]	3-4	
					Hum., Arts or Soc. Sci. Elective	4	
				ECSE-2900	Enrichment Seminar	1	
	Fourth Year						
ENGR-4010	Professional Development III	1			Professional Development II[3,4]	2	
	Technical Elective[5,6]	3-4			Restricted Elective[5,6]	3-4	
	Restricted Elective[5,6]	3-4		ECSE-4900	Multidisc. Capstone Design	3	
	Computer Eng Elective[4]	3-4			Free Elective[2]	3-4	
	Free Elective[2]	3-4			Hum., Arts or Soc. Sci. Elective	4	
					Free Elective (if needed) [2]	3-4	

1 May be taken either term.
2 The free electives must total at least 12 credits.
3 This course will be fulfilled from a list published at the start of each semester.
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.

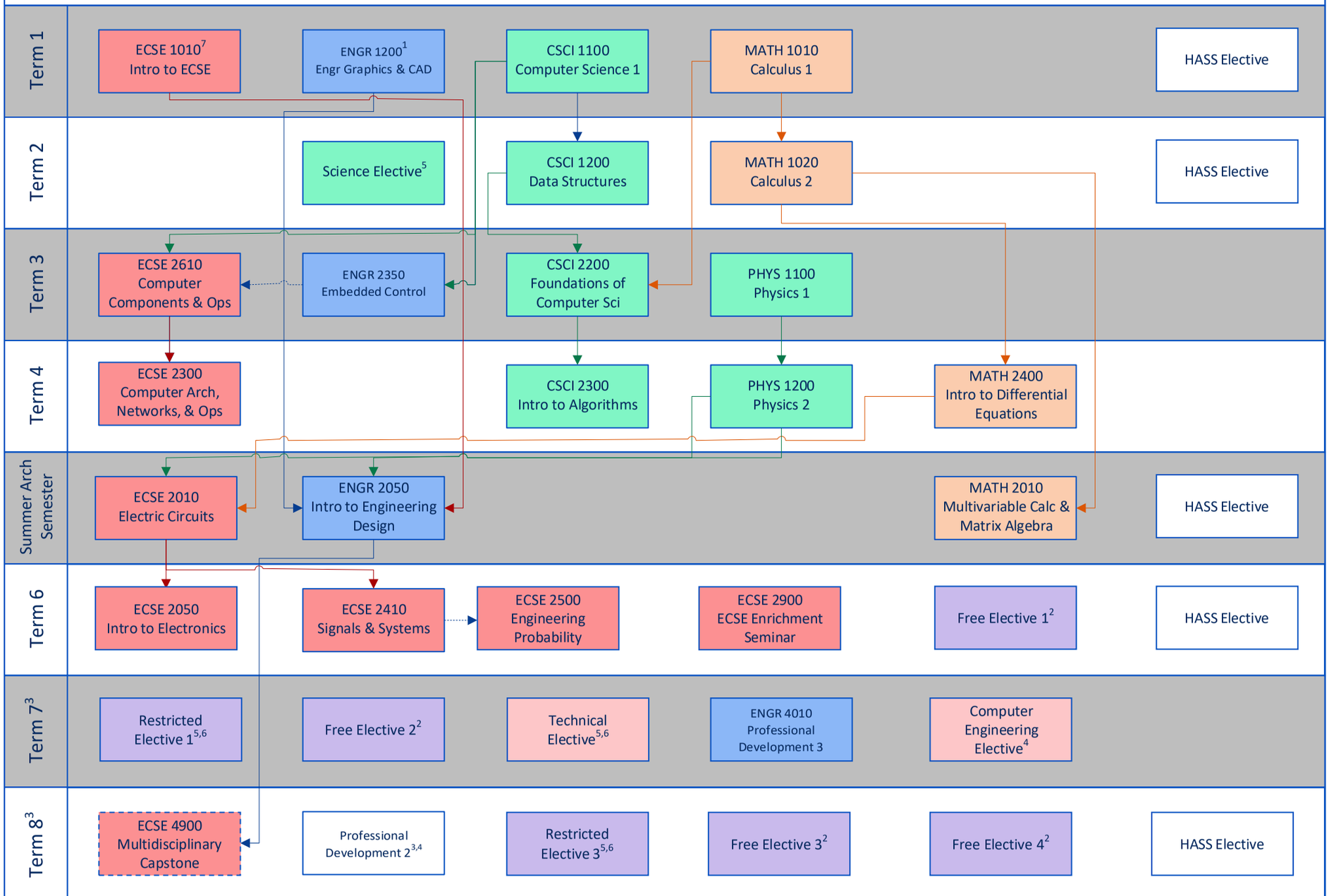
RESTRICTED ELECTIVE
Any 3 or 4 credit hour course with the designation ECSE-4xxx or ECSE-6xxx.

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

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

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

Computer Systems Engineering Curriculum and Schedule Class of 2022



Key

10-14 Core Engineering Credits	26-30 Computer Systems Core Credits
28 Science Credits	6-8 Computer Systems Elective Credits
16 Mathematics Credits	18-24 Free and Restricted Electives
22 Humanities and Social Sciences Credits	**130 Total Credit Hours**

Pre-Requisite → ····· Co-Requisite ····→ Writing Intensive Course

1. May be taken either term.
2. The free electives must total at least 12 credits.
3. This course will be fulfilled from a list published either in the catalog or at the start of each semester.
4. May be taken in the third year.
5. Students may 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 Intro to Engineering Analysis.

EE and CSE Dual Major Curriculum Checklist — Class of 2022

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				Science Elective[4]	4		
	Hum., Arts or Soc. Sci. El.	4			CSCI-1200	Data Structures	4		
						Hum., Arts or Soc. Sci. El.	4		
Fall					Second Year	Spring			
ENGR-2350	Embedded Control	4			ECSE-2660	Cptr Arch, Nets, & Op Sys	4		
ECSE-2610	Cptr. Comp. & Operations	4			MATH-2400	Intro. to Differential Eqns.	4		
CSCI-2200	Foundations of Comp. Sci.	4			PHYS-1200	Physics II	4		
PHYS-1100	Physics I	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-2010	Electric Circuits	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.

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.

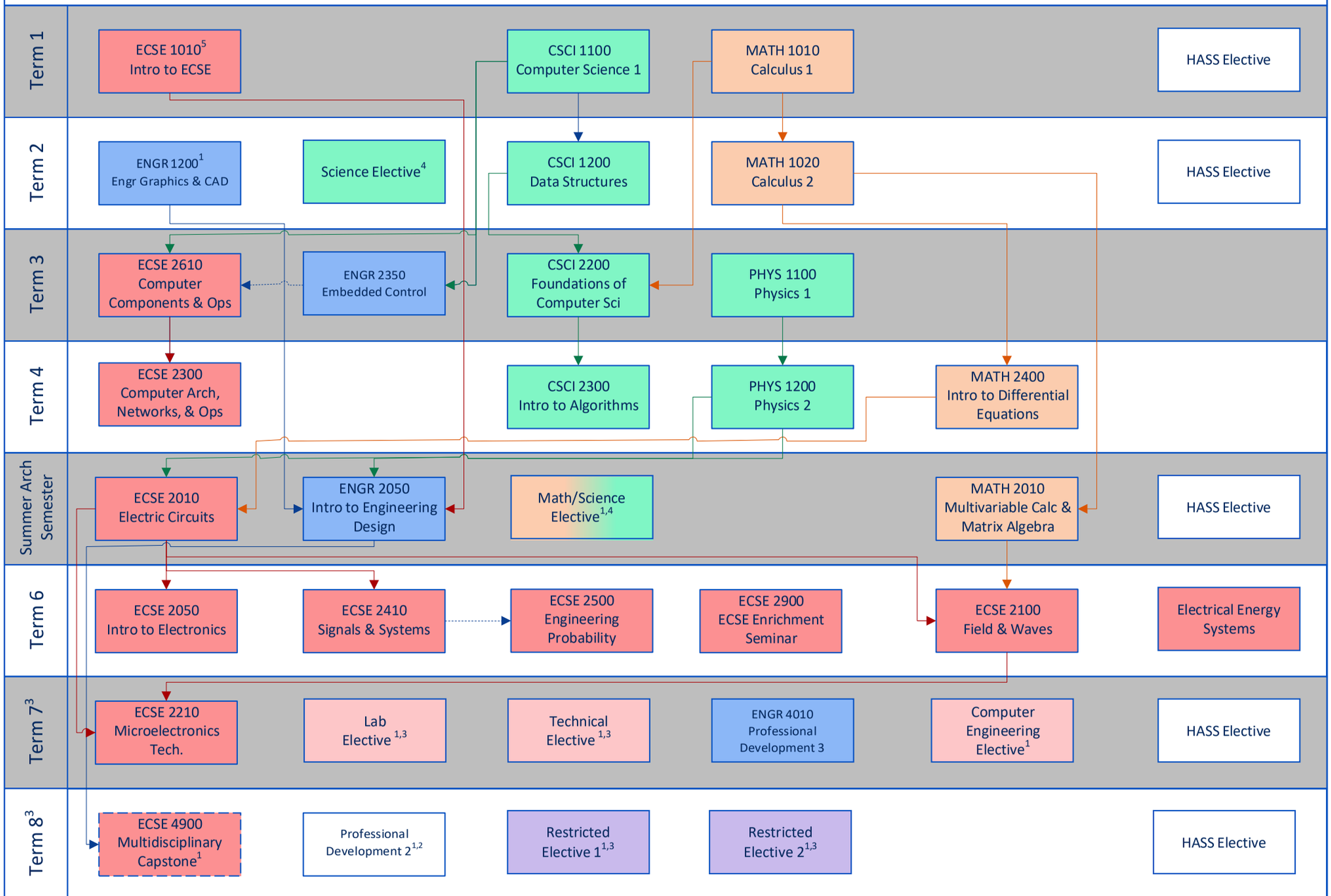
MATH/SCIENCE ELECTIVE
A 4-credit-hour course (or a 3-credit-hour course with a 1-credit-hour laboratory) in Science (ASTR, BIOL, CHEM, ERTH, PHYS) or Mathematics (MATH, MATP). An independent Study course cannot be used to satisfy this requirement.

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.

Electrical Engineering and Computer Systems Engineering Dual Curriculum and Schedule Class of 2022



Key

10-14 Core Engineering Credits	26-30 Computer Systems Core Credits
28 Science Credits	6-8 Computer Systems Elective Credits
16 Mathematics Credits	18-24 Free and Restricted Electives
22 Humanities and Social Sciences Credits	**135 Total Credit Hours**

Pre-Requisite → ····· Co-Requisite ····→ Writing Intensive Course

1. May be taken either term.
2. May be taken in the third year.
3. Students can choose to 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 Multidisciplinary Elective must take CHEM-1100.
5. May be replaced with ENGR-1100 Introduction to Engineering Analysis

CSE and Computer Science Dual Major Curriculum Checklist Class of 2022

**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	
	Hum., Arts or Soc. Sci. Elective	4			Hum., Arts or Soc. Sci. Elective	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		CSCI-2600	Principles of Software	4	
MATH-2010	Multivar Calc & Matrix Alg.	4		ECSE-2500	Engineering Probability	3	
CSCI-4210	Operating Systems	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.

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

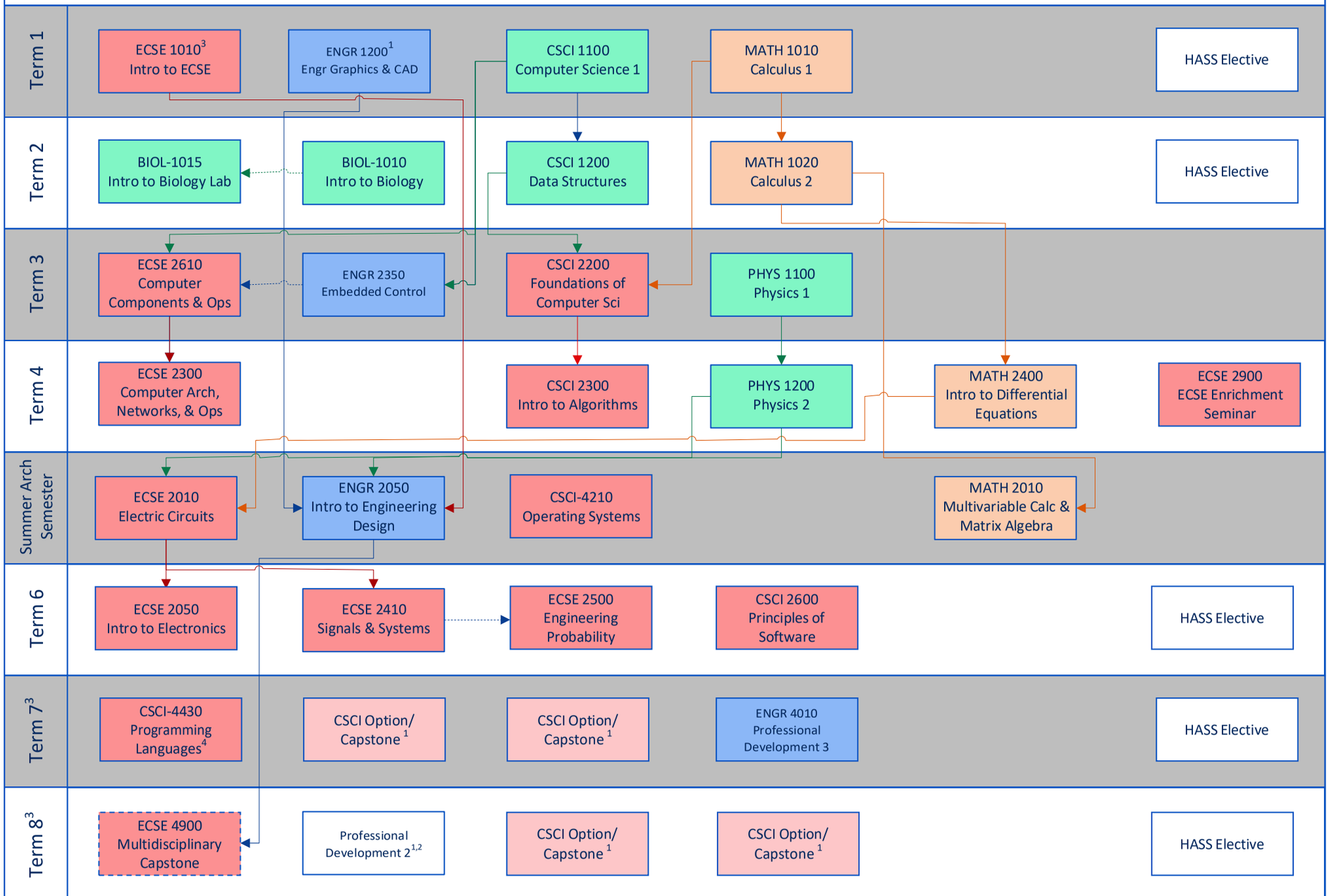
CSCI OPTION
Courses of three or four credits at the 4000 or 6000 level. For this purpose, courses in the series CSCI 4xxx, CSCI 6xxx, ECSE 46xx, and ECSE 47xx may be used, excluding ECSE 4630, ECSE 4640, ECSE 4720, and reading and independent study courses. The Pass/No Credit option cannot be used for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

Computer Systems Engineering and Computer Science Dual Curriculum and Schedule Class of 2022



Key

- 10-14 Core Engineering Credits
- 17 Science Credits
- 16 Mathematics Credits
- 22 Humanities and Social Sciences Credits
- 48 Computer Systems and Computer Science Core Credits
- 16 CSCI Option/Capstone
- **129 Total Credit Hours**

Pre-Requisite → Co-Requisite ⇢ Writing Intensive Course

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.

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

EE and Applied Physics Dual Major Curriculum Checklist Class of 2022

	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-1100	Physics I	4			PHYS-1200	Physics II	4	
	Hum., Arts or Soc. Sci. Elective	4				Hum., Arts or Soc. Sci. Elective	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-2610	Cptr. Comp. & Operations	4	
PHYS-2210	Quantum Physics I	4				Hum., Arts or Soc. Sci. Elective	4	
SUMMER ARCH SEMESTER				**Third Year**		**Fall or Spring**		
ECSE-2050	Intro. to Electronics	4			ECSE-2900	ECSE Enrichment Seminar	1	
ECSE-2410	Signals & Systems	3			MATH-4600	Advanced Calculus[4]	4	
ECSE-2500	Engineering Probability	3			ECSE-4220	VLSI Design	3	
MATH-2010	Multivariable Calc & Matrix Algebra	4			ECSE-2110	Electrical Energy Systems	3	
	Hum., Arts or Soc. Sci. Elective	4			PHYS-2220	Quantum Physics II	4	
	Fourth Year							
ENGR-4010	Professional Devel. III [1]	1				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	
	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] May be replaced with other 4000-level math classes upon approval of degree coordinator.

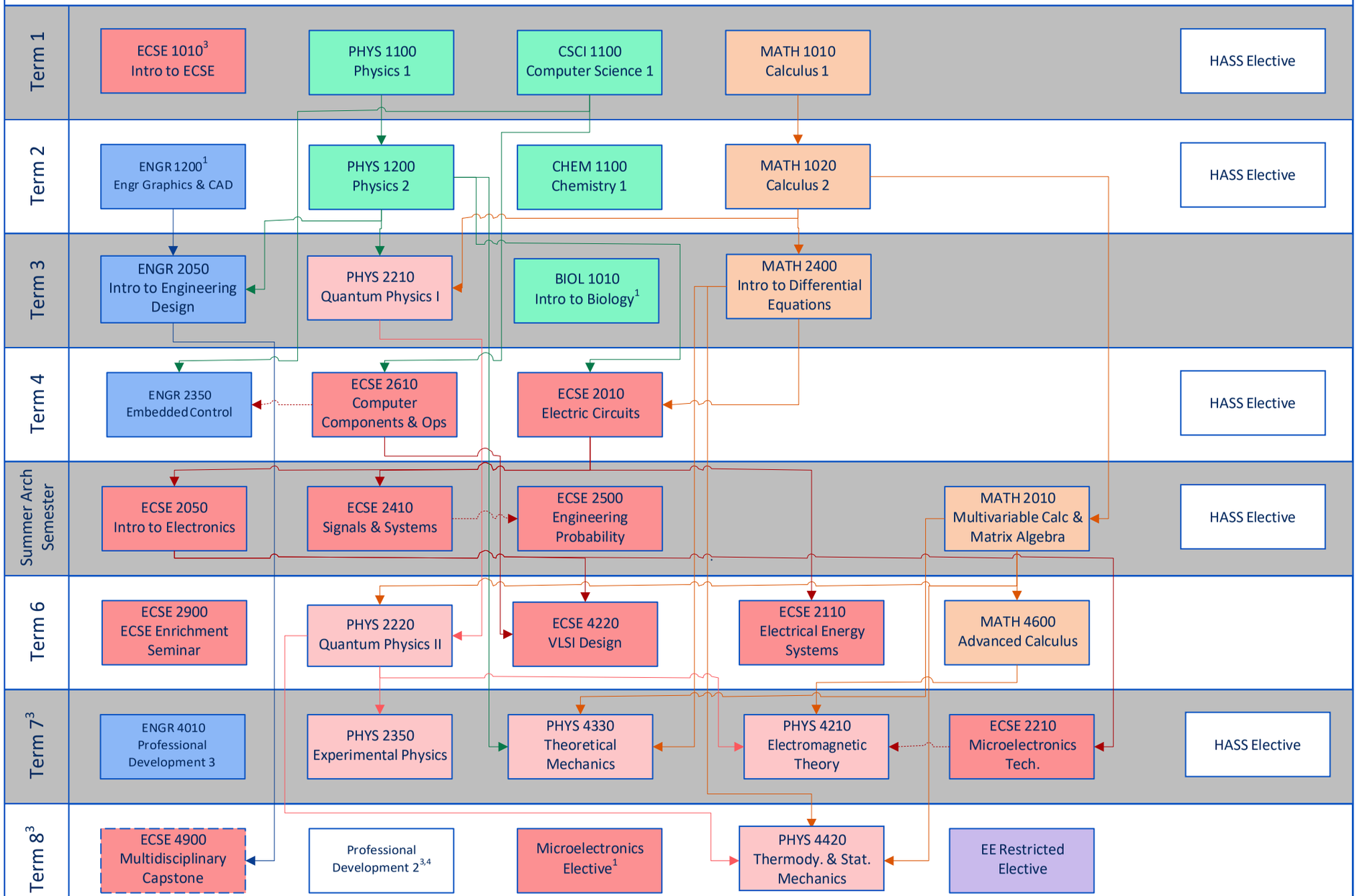
137 credits minimum

***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

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

Electrical Engineering and Applied Physics Dual Curriculum and Schedule Class of 2022



Key

10-14 Core Engineering Credits	38-42 Electrical Engineering Core Credits
20 Science Credits	24 Physics Core Credits
20 Mathematics Credits	3 Free and Restricted Electives
22 Humanities and Social Sciences Credits	**137 Total Credit Hours (minimum)**

Pre-Requisite → ····· Co-Requisite ····→ Writing Intensive Course

1. May be taken either term.
2. May be taken in the third Year.
3. May be replaced with ENGR 1100 Intro to Engineering Analysis.
4. May be replaced with other 4000-level math classes upon approval of the degree coordinator.