Electrical Engineering Program / Course checklist for students who started 2nd year in Sep. 2020

COURSE	CREDITS	Y/N
ELEC 201	4 cr.	
CPEN 211	5 cr.	
ELEC 202	4 cr.	
ELEC 211	2 cr.	
ELEC 221	4 cr.	
CPSC 259	4 cr.	
MATH 253	3 cr.	
MATH 256	3 cr.	
MATH 264	1 cr.	
ELEC 291	6 cr.	
ELEC 281	3 cr.	
ELEC 301	4 cr.	
ELEC 311	4 cr.	
ELEC 315	4 cr.	
ELEC/STAT 321	4 cr.	
ELEC 341	4 cr.	
ELEC 342	4 cr.	
ELEC 391	6 cr.	
Breadth electives	3+ cr.	
ELEC 491	10 cr.	
ELEC 481	3 cr.	
APSC 450	2 cr.	
Advanced Electives	12 cr.	
Math Elective	3 cr.	
Compl. Studies	6 cr.	
Free Electives	6 cr.	
TOTAL CREDITS	114 cr.	

The lists of approved electives appears later in this document. Generally one cannot apply a course to more than one requirement. The only exception to this rule is that up to 3 credits may be double-counted towards the requirements for a minor and towards the free credits requirement.

Note that not all electives are offered each year.

First Year Core Program Requirements

COURSE	CREDITS	Y/N
APSC 100	3 cr.	
APSC 101	3 cr.	
APSC 160	3 cr.	
CHEM 154	3 cr.	
MATH 100	3 cr.	
MATH 101	3 cr.	
MATH 152	3 cr.	
PHYS 157	3 cr.	
PHYS 158	3 cr.	
PHYS 159	1 cr.	
PHYS 170	3 cr.	
WRDS 150	3 cr.	
Compl. Studies	3 cr.	
TOTAL CREDITS	37 cr.	

General Comment Regarding Year-Level Advancement

Students must complete 80% of the credits required for any given year to advance to the next year.

Also, students that have not completed ELEC 281 will be restricted to 9 credits of 400-level courses until ELEC 281 is completed.

Comments About Timing for Electives

Students have some flexibility in when certain electives are completed although it is typical for students to complete breadth electives in Year 3 and advanced electives in Year 4. It may be advantageous to distribute electives across Years 3 and 4 based on student interests.

Electives

	Category	Course	Credits
	Complementary Studies (9 credits)		
	Humanities & Social Studies (1)		3 cr.
	Humanities & Social Studies (2)		3 cr.
	Impact of Technology on Society		3 cr.
	Breadth Electives (3+ credits)		
	Breadth Elective		
	Advanced Electives (12 credits; 3-4 credits)		
	Advanced Elective (1)		
	Advanced Elective (2)		
	Advanced Elective (3)		
	Advanced Elective (4)		
	Mathematics Elective (3 credits)		
	Mathematics Elective		
	Free Electives (6 credits)		
	Free Elective (1)		
	Free Elective (2)		

List of Electives

Advanced Electives

COURSE	CREDITS	COURSE TITLE
ELEC 400^		Topics in Electrical Engineering
ELEC 401	3 cr.	Analog CMOS IC Design
ELEC 402	4 cr.	Introduction to VLSI Systems
ELEC 403	3 cr.	Advanced VLSI Systems
ELEC 404	3 cr.	RF Integrated Circuits
ELEC 411	3 cr.	Antennas & Propagation
ELEC 412	3 cr.	Optical Waveguides & Photonics
ELEC 413	3 cr.	Semiconductor Lasers
ELEC 415	3 cr.	Semiconductor Devices: Physics, Design and Analysis
ELEC 416	3 cr.	Quantum Dots and Device Applications
ELEC 421*	3 cr.	Digital Signal Processing
ELEC 422*	3 cr.	Biosignals & Systems
ELEC 431	3 cr.	Communication Systems I
ELEC 432	3 cr.	Communication Systems II
ELEC 433	3 cr.	Error-Control Coding
ELEC 434	3 cr.	Introduction to Optical Networks
ELEC 441	3 cr.	Control Systems
ELEC 442	3 cr.	Introduction to Robotics
ELEC 451	4 cr.	Power Electronics
ELEC 452	3 cr.	Industrial Drives
ELEC 453	4 cr.	Power Systems Analysis I

COURSE	CREDITS	COURSE TITLE
ELEC 454	4 cr.	Power Systems Analysis II
ELEC 455	3 cr.	Power Systems Protection
ELEC 456	3 cr.	Decision Support Methods in Power Systems Operation
ELEC 457	3 cr.	Optimization of Power Systems Operation
ELEC 461	3 cr.	Nanotechnology in Electronics
ELEC 462	3 cr.	Sensors and Actuators in Microsystems
ELEC 463	3 cr.	Micro/Nanofabrication and Instrumentation Laboratory
ELEC 464	3 cr.	Nanotechnology & Nature
ELEC 465	3 cr.	Microsystems Design
ELEC 471	3 cr.	Medical Imaging
ELEC 472	3 cr.	Biomechatronics
ELEC 473	3 cr.	Biological Micro-Electro-Mechanical Systems
ELEC 474	3 cr.	Biophotonics
ELEC 499#		Undergraduate Thesis
CPEN 400^		Topics in Computer Engineering
CPEN 411	4 cr.	Computer Architecture
CPEN 412	4 cr.	Microcomputer Systems Design

Note:

1. *Typically*, courses offered under the umbrella of ELEC 400 will count as advanced electives. Some courses offered under the umbrella of CPEN 400 *may* count as advanced electives.
   1.1. **ELEC 400M (Machine Learning Fundamentals for Engineers)**, when offered, will count as an advanced elective.
   1.2. **CPEN 400D (Deep Learning)**, when offered, will count as an advanced elective.
2. Up to 3 credits of ELEC 499 (Undergraduate Thesis) can be used to satisfy the advanced electives requirement.
3. One can claim credit for one of ELEC 421, ELEC 422.

Breadth Electives

1. CPEN 311 (Digital Systems Design)
2. CPEN 333 (Systems Software Engineering)
3. ELEC 331 (Computer Communications)
4. ELEC 352 (Electric Energy Systems)

Mathematics Electives

- **MATH** 220, 300, 301, 302, 303, 305, 307, 320, 321, 322, 323, 340, 341, 342, 344, 400, 401, 404, 405, 406, 418, 419, 420, 421, 422, 425, 426, 427, 437, 440, 441, 442, 443.
- **STAT** 302, 305, 306, 344, 404, 406, 443, 460, 461.

Complementary Studies Electives

Engineering students complete **9 credits of elective coursework** as part of their complementary studies requirement.

- 6 credits are chosen from the list of Humanities and Social Studies. (Typically, 3 of these 6 credits are completed in Year 1.)
- 3 credits should cover the Impact of Technology and Society.
- At most one language course can be used towards the complementary studies requirement.

More details regarding the complementary studies are maintained by Engineering Academic Services: https://academicservices.engineering.ubc.ca/degree-planning/course-planning/

Note that the following required courses for Electrical Engineering students also fall into the Complementary Studies category:
- WRDS 150 (or equivalent);
- ELEC 281: Technical Communication;
- ELEC 481: Economic Analysis of Engineering Projects;
- APSC 450: Professional Practice.

Free Electives

Students in Electrical Engineering should complete 6 credits of free electives (courses from across all campus units). These credits must be completed at the University level (no transfer credit for AP coursework or for other courses completed in high school apply).

Free credits are intended to allow students to explore a variety of disciplines. The primary restriction on the free electives is that at most 3 credits can be at the 100-level.

Only 3 credits of language courses can be applied towards the free electives requirement.

Co-op courses are non-academic credits and cannot be used towards the free electives requirement.