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WELCOME TO SOFTWARE ENGINEERING

Engineering the Digital Future: Trust, Safety, and Systems at Scale

2nd-Year Student Orientation & Welcome | 2026–2027

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SENG Program Director

Territory Acknowledgement

We acknowledge and respect the Lək̓ʷəŋən (Songhees and Xʷsepsəm/Esquimalt) Peoples on whose territory the university stands, and the Lək̓ʷəŋən and WSÁNEĆ Peoples whose historical relationships with the land continue to this day.

Image generated with Gemini Notebook

Software Engineering Transforms Digital Ideas into Systems That Society Can Trust

Engineering vs. Programming

Programming is writing code; Engineering applies systematic, disciplined, and quantifiable principles to build large-scale systems that behave predictably 24/7/365 under real-world constraints.

Endless Impact

Taking a spark of an idea and turning it into a massive, secure digital system that thousands or millions of people safely trust and use every day, while preventing catastrophic crashes.

Core Program Focus

Large-scale and AI-driven software systems, development and operations (DevOps), resilient software architecture, safety-critical quality assurance, software evolution, software engineering leadership, life-long learning.

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Large-scale software is highly impactful… that's why it is considerably more complex!

- Modern software systems process millions, billions, or tens of billions of daily events
  - Requires testing against part per million, part per billion, or even stricter failure thresholds
- Frameworks, coding languages, APIs, deployment regimes, etc., change rapidly
  - The typical software industry technology half-life is around 6 months
- Systems must be designed to scale and support evolving needs:
  - New features, purposes, workloads, higher volumes, etc.
- Have to deal with intelligent capable adversaries (including nation-state ones)
- Have to meet regulatory and best practice requirements (privacy laws, etc.)
- Have to work across a complex multiplicity of geopolitical contexts and jurisdictions
- Underlying mathematical models ranging from complex to highly complex

These are the largest, most complex systems humanity has ever built!

Makes SENG one of the most impactful, exciting, challenging, dynamic, and rapidly evolving engineering disciplines!

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Generative AI Automates Code Syntax, Elevating the Need for Qualified Software Engineers

"Writing code is NOT the same as engineering a system. AI automates local syntax, but software engineers are the master architects who ensure systems are safe, secure, resilient, and trustworthy."

Syntax vs. Systems

AI models write localized lines of code, but cannot negotiate ambiguous requirements, perform system-level trade-off analysis, or guarantee non-functional quality attributes.

Architects of Trustworthy Systems

Unchecked AI introduces security flaws, hallucinated logic, and model drift. SENGs design defensive architectures, test harnesses, and runtime governance to keep AI predictable.

Full-Stack Orchestrators

Software Engineers don't fear AI; **we command it**. We direct AI co-pilots and autonomous coding agents while enforcing strict human-in-the-loop safety and ethical safeguards.

Difference Between Software Engineering, Computer Engineering, and Computer Science?

Science focuses on: "What is possible?"

Computer science focuses on the underlying science of computers and computer-based technologies.

Engineering focuses on: "Converting the possible into the day-to-day"

Engineering expands math and science foundations to build usable (and well-engineered) real-world systems and solutions to advance societies.

Computer Engineering focuses on the interfaces between the physical and cyber worlds and on hardware-facilitated computations.

Software Engineering focuses on the conception, design, implementation, operation and evolution of modern large- to global-scale software-centric systems, as well as the leadership required to guide software engineering teams in delivering solutions that generate value to businesses and society at large.

BSENG Overview: 100% Mandatory Co-op Operates as an Integrated Experiential Engine Throughout Your Degree

Year 4: Advanced Specializations & Capstone (SENG 499)
Major Design Experience | DevOps (SENG 426), Embedded (SENG 440), Real-Time Systems, Technical Electives

Year 3: Core SENG Areas & Architecture
Software Architecture (SENG 350), Security Engineering (SENG 360), Requirements (SENG 321), Database Systems (CSC 370)

Year 2: SENG Fundamentals & Breadth-First Exposure
Software Development Methods (SENG 265), Testing (SENG 275), HCI (SENG 310), Cyber-Physical Systems & IoT (ECE 270)

Year 1: Common Engineering Fundamentals & Career Foundation
Programming (CSC 110/115), Design & Comm (ENGR 110/120), Math & Physics, Professional Practice (ENGR 130)

4 Mandatory Work Terms (16 Months) A Huge Advantage!

- Paid, supervised, professional experience
- ENGR 130 GitHub portfolio baseline
- Bridges academic theory directly to industry practice
- Establishes professional networks & full-time job offers before graduation

CEAB Accreditation Grants You a Direct Pathway to Earning Your Professional Engineer (P.Eng.) Designation

Protected Legal Titles

In BC, anyone who practises software engineering, or who uses the title “software engineer” (or a similar title that implies that they are a software engineer, like “firmware engineer”, “mobile app engineer”, etc.), must be registered with Engineers and Geoscientists BC.

Public Safeguarding Mandate

When software controls critical public infrastructure (transit, medical devices, energy grids), a licensed Professional Engineer must take legal responsibility for public safety.

Your Global VIP Pass

A CEAB-accredited B.Eng. degree tells top global employers, tech giants, and governments: “I don't just write code—I build digital systems society can safely trust.”

The 12 CEAB Graduate Attributes in Software Engineering

GA 1: Knowledge Base

Math, sciences, & SENG fundamentals.

Discrete math, algorithms, signals, software architecture, & computing theory.

GA 2: Problem Analysis

Identify, formulate, & solve complex problems.

Decomposing system complexity, trade-off analysis, & data modeling.

GA 3: Investigation

Conduct experiments, data analysis, & synthesis.

Performance profiling, empirical metrics, safety testing, & debugging.

GA 4: Engineering Design

Design solutions meeting specified needs.

Software architecture, API design, design patterns, & SENG 499 Capstone.

GA 5: Engineering Tools

Apply, adapt, & extend modern SENG tools.

IDEs, Git version control, CI/CD build pipelines, Docker, & static analysis, Agentic AI, Gen AI.

GA 6: Teamwork

Work effectively as member/leader in teams.

Agile team dynamics, code reviews, collaborative SCM, & peer feedback, team leadership.

GA 7: Communication

Communicate complex concepts to society.

Understanding user and business needs, software documentation, UML modeling, technical reports, & pitches.

GA 8: Professionalism

Role of engineer in society & public protection.

Safeguarding public safety in critical infrastructure, medical IoT, & transit.

GA 9: Societal & Env. Impact

Analyze social, economic, & legal aspects.

Sustainable computing, green software architecture, & automation ethics.

GA 10: Ethics & Equity

Apply professional ethics & equity.

Ethical AI governance, user privacy, accessibility & DEI (Diversity, equity, and inclusion).

GA 11: Economics & Project Mgmt

Incorporate business, risk, & change mgmt.

Software economics, effort estimation, agile planning, & risk management.

GA 12: Life-Long Learning

Identify & address own educational needs.

Continuous learning, adapting to tech cycles, & GenAI-assisted workflows.

Some of the Key Courses for SENG Graduation Attributes

- (SENG 321) Communicate precisely between developers and stakeholders
- (SENG 350) Communicate precisely among developers
- (SENG 310) Design human-computer interfaces
- (SENG 371) Design and maintain multi-version software
- (SENG 371) Design software for reuse
- (SENG 371) Revise old (legacy) software
- (SENG 275/426) Software quality assurance
- (SENG 360) Develop secure software
- (SENG 350) Create and use models in system development
- (SENG 440) Specify, predict, analyze and evaluate performance
- (SENG 350/371) Be disciplined in development and maintenance
- (SENG 371) Use metrics in system development
- (SENG 350/440) Manage complex projects
- (SENG 426/440) Deal with concurrency
- (ECE 265) Understand and use non-determinacy
- (ECE 265) Apply mathematics to increase quality and efficiency

SENG Program Structure

- SENG is a jointly delivered and shared program between the:
  - Dept. of Computer Science, and
  - Dept. of Electrical and Computer Engineering
- Many capable and highly trained professors!
- CSC's core SENG courses: SENG 265, 275, 310, 321, 350, 360, 371, 401
- ECE's core SENG courses: SENG 426, 440, 499

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Interesting Technical Electives

- CSC 321 Introduction to Artificial Intelligence
- ECE 485 Data Analysis and Pattern Recognition
- SENG 455 Startup Studio
- SENG 468 Software System Scalability
- SENG 474 Data Mining
- SENG 480x topics course "Community Engaged Research and Innovation"

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SENG Specializations

- Topics with high industry demand:
  - Data mining and analysis, artificial intelligence, and machine learning
  - Cyber-physical and smart systems
  - Cybersecurity and privacy
  - Performance and scalability
  - Interaction design and data visualization
  - Visual computing (vision/graphics)
- https://www.uvic.ca/ecs/software/current-students/specializations/index.php

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Advising

- David Clark
  - Students with year standing 2 and 3
  - cscadvisor2@uvic.ca
  - To meet in person, drop by ECS515 Monday to Friday from 11:00am to 2:00pm
- Irene Statham
  - Students with year standing 4 and above
  - cscadvisor@uvic.ca
  - To meet in person, drop by ECS512 Mondays from 1:00pm to 3:00pm and Tuesdays from 9:30am to 11:30am

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Plan Your Schedule

- Some courses are offered only once per year
- Work with your advisor to make sure you have everything covered

Program: Software Engineering
Degree: Bachelor of Software Engineering (BSEng)
Faculty: Engineering and Computer Science
Effective: Winter Session 2026/27

These requirements apply to students who declared into Software Engineering in September 2026 or later. If you declared earlier, please contact your Academic Advisor for confirmation of your requirements.

Year 1			
Requirement	**Offered**	**Units**	**Taken**
Term 1A – Fall			
CSC 110	F, Sp, Su	1.5	
ENGR 110	F	2.5	
ENGR 130	F, Sp	0.5	
MATH 100 or 109	F, Sp, Su	1.5	
MATH 110	F	1.5	
PHYS 110	F, Sp	1.5	
Term 1B – Spring			
CHEM 150 (Sp, Su) or CHEM 101 (Su, F)	F, Sp, Su	1.5	
CSC 115	F, Sp, Su	1.5	
ENGR 120	Sp	2.5	
MATH 101	F, Sp, Su	1.5	
Natural Science	F, Sp, Su	1.5	
Co-op – Summer			

Year 2			
Term 2A – Fall			
ECE 255 (F) or CSC 230	F, Sp, Su	1.5	
ECE 265	F, Su	1.5	
MATH 122	F, Sp, Su	1.5	
SENG 265	F, Sp, Su	1.5	
STAT 260	F, Sp, Su	1.5	
Complementary Studies	F, Sp, Su	1.5	
Co-op – Spring			
Term 2B – Summer			
CSC 225	F, Sp, Su	1.5	
ECE 270	Su	1.5	
ECON 180	F, Su	1.5	
SENG 275	Sp, Su	1.5	
SENG 310	F, Sp, Su	1.5	
Complementary Studies	F, Sp, Su	1.5	
Co-op – Fall			

Year 3			
Requirement	**Offered**	**Units**	**Taken**
Term 3A - Spring			
ECE 363 (Sp) or CSC 361	F, Sp	1.5	
CSC 226	F, Sp, Su	1.5	
ECE 360	F, Sp	1.5	
SENG 321	Sp	1.5	
SENG 371	Sp	1.5	
Natural Science	F, Sp, Su	1.5	
Co-op – Summer			
Term 3B - Fall			
ECE 355 or CSC 355	F	1.5	
CSC 320	F, Sp, Su	1.5	
CSC 360	F, Sp, Su	1.5	
CSC 370	F, Sp, Su	1.5	
SENG 350	F	1.5	
SENG 360	F	1.5	
Co-op – Spring			

Year 4			
Term 4A – Summer			
SENG 426	Su	1.5	
SENG 440	Su	1.5	
SENG 499	Su	3.0	
2 Technical Electives	F, Sp, Su	3.0	
Co-op – Fall			
Term 4B – Spring			
ECE 455 or CSC 460	Sp	1.5	
SENG 401	Sp	1.5	
3 Technical Electives	F, Sp, Su	4.5	
Natural Science	F, Sp, Su	1.5	

Co-op Support

- Your co-op coordinators:
  - Ash Senini, asenini@uvic.ca (V#s ending 0-4)
  - Imen Bourguiba, imenbour@uvic.ca (V#s ending 5-9)
- We can help you with:
  - Resumes
  - Cover letters
  - Strategies to find your own co-op job

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Co-op Portal

- https://learninginmotion.uvic.ca (LIM)
- Co-op job postings
- Upload your resume and cover letter
- Apply for co-op jobs
- Events and workshops
- Book an appointment with your co-op coordinator

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To See Co-op Jobs on LIM

- Co-op Terms & Conditions (submit via LIM)
  - Only submitted once while you are in the ENGR program
- Co-op Jobs Access form
  - Submitted every term when you want to start applying for your next work term’s jobs

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Create a SENG Portfolio

- As you go through the degree, courses, and course projects, it can be useful to build up an on-line portfolio of what you have done
- A portfolio allows employers to see what you have actually done while getting a sense of your coding competencies and skills
- Include student club activities, course projects, open source contributions, directed studies, and self-driven projects

Student Clubs

- VikeLabs (app development)
- UVic GameDev
- Cyber Security Challenge Canada
- UVic Satellite Design Team
- Formula Racing and Formula Hybrid race car teams
- UVic Robotics Club
- UVic Rocketry Club
- Autonomous Underwater Vehicle Interdisciplinary Club (AUVic)
- More at https://www.uvic.ca/ecs/students/student-clubs-and-teams/index.php
- Employers see high value in student engagement with clubs and student competitions!

ECSS Makerspace

- The ECS Makerspace workshop is available to you as SENG students
- It features design space, tools and equipment
- https://www.uvic.ca/ecs/students/ecss-makerspace/index.php

Support

- Mental Health and Wellness
  - https://www.uvic.ca/student-wellness/wellness-resources/mental-health/
- If challenges arise:
  - Talk to someone – friends, staff, faculty
  - Reach out to Student Wellness
  - Use the SupportConnect web tool
- Many very successful people had challenges in their undergrad degrees – you are not alone!

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Support

- Sexualized Violence Resource Office
  - https://www.uvic.ca/sexualizedviolence/

Common Questions!

Why Mandatory Co-op?

- Industry wants people with experience
  - Technical and soft (or complementary) skills
- Having industry experience is a significant competitive advantage as you leave university and enter your careers
- Use the knowledge and skills gained in your degree to quickly come up to speed in the tools and frameworks industry is currently using
  - Flavour-of-the-day tech changes rapidly (typical half-life is six months)
  - Job descriptions focus on today's tech (expecting you'll learn tomorrow's)
  - Career success and impact requires life-long learning

Why Is SENG Longer than a CSC Program?

- CEAB accreditation has richer depth and breadth requirements
  - Increasingly, industry cares a lot about this richer depth and breadth
- Focus is on training for a career:
  - Gain skills and knowledge to do today's jobs
  - While keeping pace with (or making) tomorrow's tech
  - Software is the tool by which we do the Engineering
- Focus of SENG and CSC major are different which leads to increasingly different career paths

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Why the ECE Courses?

- Signal processing course – ECE 265
- Control theory course – ECE 360
- Needed background to:
  - Understand how to measure and interpret real-world data
  - Build systems that enact actions based on measured data, e.g., self-driving cars, drones, eHealth systems, cloud management systems, smart cities and buildings, etc.
  - Very useful entry point into data analytics, AI & ML

Contact Us

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- Cassandra Petrachenko, Program Coordinator
  - bsengoff@uvic.ca

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