

BSENG Bachelor of Software Engineering Overview

Faculty of Engineering University of Victoria V5.2





Objectives of this document

To explain the Bachelor of Software Engineering (BSENG) degree program
To help with BSENG discussions in the Departments, the Faculty, and the University



Outline



- What is software engineering?
- Demand for software engineers
- What is the difference between CSC, CENG, BSENG?
- BSENG at a glance
- Objectives of the BSENG
- Program approval process
- Target deadlines



What is Software Engineering

- SE is a systematic and disciplined approach to developing and evolving software
 - From early requirements engineering and design to long-term maintenance and evolution
- SE applies *both* computer science and engineering principles and best practices to the creation, operation, and maintenance of software systems
- SE deals with the entire spectrum of applications
 - From real-time embedded systems to long-lived information systems
 - From safety-critical systems to network-centric games



Demand for Software Engineers

- The software industry has grown dramatically over the years
- Mechanical and electronic devices in automobiles, airplanes, entertainment and communication equipment, manufacturing are being replaced by software components because software is more adaptable and can provide greater functionality.
- Software is used in medical, transportation and financial systems to automate critical tasks.
- Scientists and business researchers use software to sift through data warehouses and identify pertinent facts and/or trends.
- Banking, insurance, and other businesses use software to automate and personalize the services they offer to their customers.
- This proliferation of software applications has led to an urgent and growing demand for software professionals in Canada.



What is the difference between CSC, CENG, and SENG?

- The three programs have common elements
 - stress an understanding of both digital hardware and software, though to varying degrees
 - hone students' problem solving skills
- Graduates of all three programs may compete for some of the same jobs
- However, the programs have different objectives



Computer Engineering (CENG

- Deals with designing, developing, and operating computer systems
- Concentrates on digital hardware devices and computers, and the software that controls them
- Advanced courses focus on standard designs and techniques for specific application domains
- In contrast to CSC and SENG, CENG emphasizes solving problems in digital hardware and at the hardware-software interface (i.e., firmware)





Computer Science (CSC)

- Focuses on understanding, designing, and developing programs and computers
- Concentrates on data, data transformation, and algorithms
- Advanced courses present specialized programming techniques and specific application domains
- The CSC program is less structured than the CENG and SENG programs, giving students more flexibility to build depth or breadth in a variety of application domains or in the fundamentals of Computer Science.



Software Engineering (SENG)

- Deals with building and maintaining software systems
- SENG is more software oriented and has a greater emphasis on large software applications than Computer Engineering
- SENG is more applied than Computer Science, placing greater emphasis on the entire software development process, from idea to final product
- SENG is also more disciplined than Computer Science, applying more systematic practices and engineering design to help ensure that products are reliable and safe
- SENG emphasis communication skills





BSENG at a glance

- Four year program leading to a Bachelor's of Software Engineering (BSENG) degree
- Innovative, attractive, interdisciplinary
- Accredited by CEAB and CSAC
- Transfers from colleges into third year
- 16 months, mandatory, flexible co component
- Common first year
- 47 courses
- 6 courses per term except for 5 courses in 1st term
- 22.5 hours per week on average (including labs)



BSENG Objectives



- To provide the students with a thorough understanding of the principles, methods, processes and tools required for the successful design and development of dependable, large, long lived software systems
- To provide the students with experience in teamwork and management; preparing them for the role of technical management
- To provide communication skills to work effectively with other engineers and computer scientists





BSENG Design Documents

The BSENG curriculum is available in the form of

- SENG Formal Program Proposal (.doc)
- BSENG overview presentation (.ppt)
- SENG student perspective (.xls)
- SENG prerequisite structure (.xls)
- SENG new, changed, unchanged courses (.xls)
- BSENG common 1st-year (.xls)
- Short calendar course descriptions (.doc)
- Detailed course descriptions (.doc)
- A calendar entry (.doc)
- Letter of Intent (.doc)
- Software Engineering Administrative Structure (.doc)





BSENG Advertising

BSENG Web Site http://www.beseng.uvic.ca
BSENG Brochure
BSENG Slides
BSENG Newspaper ads



BSENG Design

BSENG consists of five major parts

- First year common with other programs (7 courses)
- Required engineering core (30 courses)
- Engineering electives (at least 7 must be taken)
- Basic science (6 courses, MECHSYS, ELECSYS, plus at least 4)
- Complementary studies (SOCIAL, plus at least 5 courses)
- The required engineering core consists of four parts
 - Software engineering core (13 courses)
 - Mathematics core (7 courses)
 - Computer science core (6 courses)
 - Engineering and science core (8 courses)





Required Engineering Core

32 courses

- Software engineering core (13 courses)
 SE1-8, WE, HCI, SEC, SOCIAL, CAP
- Mathematics core (6 courses)
 - DS1, DS2, LA, CALC1, CALC2, PS
- Computer science core (5+3 courses)
 - ALG1, AFL, CAS, DD, OSDC, DB, NET, RT
- Engineering core (5+3 courses)
 - MECHSYS, ELECSYS, DD, SYSDYN, SAS, CTRL, NET, RT





Engineering Electives

- At least 5 courses out of more than 30 courses must be elected
 - For accreditation purposes, there are two groups of electives (refer to detailed proposal)
 - There are duplicates which are offered both in CSC and ELEC/CENG (e.g., MMS); only one can be taken for credit
 - These courses are intended for 4th year; selected courses of them can be taken earlier provided the prerequisites are satisfied
- Software engineering (9 courses)
 - ✤ ARCH, CBSE, IKM, CSCW, DC, NC, MIN
 - CAP (additional elective term), Topics
- Computer science (12 courses)
 - CC, CG, MMS, CON, FTC, NA, ORLP, ORSIM
 - ✤ ALG2, ALG3, PL, Topics
- Engineering (11 courses)
 - ✤ DSP, COM, WMC, MMS, PATREC,
 - ROBOT, AI, ERGO, Topics ELEC, Topics CENG



Basic Science



- 4 courses are essentially needed to satisfy accreditation needs; the remainder of basic science accreditation units comes from other required and elective courses
- 2 courses are devoted to introducing electrical and mechanical systems
- 4 courses from physics, chemistry, biology, earth and ocean sciences; 2 courses are prescribed due to common first year





Complementary Studies

- 5 6œurses are essentially needed to satisfy accreditation needs; one slot left as a free elective
- 1 Social and professional issues
- 2 English courses
- 2 business courses
 - Economics and entrepreneurship
 - Planning and management
- 2 electives from faculties other than Science and Engineering



Year 1



Common first year for the Faculty of Engineering
 Transfer to/from other programs is feasible
 Bridge into 3rd year BSENG should be no problem

- Develop background and foundations in
 - Programming and software engineering (3)
 - Math (3)

 - Basic Science (2)



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Year 2

- Software engineering (3)
- Computer science (1+1)
- Engineering (1+1)
- Math (4)
- English (1)
- Business (1)



Concess COSELS

Year 3

- Software engineering (3)
- Computer science (3+1)
- Engineering (1+1)
- Basic science (2)
- Business (1)
- Complementary Studies (1)



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Year 4

- 2 SE courses
- Capstone project (can be two terms)
- 1 NET
- 1 RT
- 1 free elective
- 1 social and professional issues





Program Approval Process

LOI approved by Departments	Nov 2001
LOI approved by Faculty	Dec 2001
LOI approved by Senate Planning	Jan 2002
LOI approved by DPRC	Apr 2002
LOI back to Faculty	Apr 2002
BSENG to Dean and Departments	May 2002





Program Approval Process

BSENG approved by Departments	Aug 2002
BSENG approved by Faculty	Sep 2002
FP approved by Departments & Faculty	Sep 2002
BSENG FP approved by Senate Plan.	Oct 2002
BSENG FP approved by Senate	Nov 2002
BSENG Calendar Entry app. by Depts.	Nov 2002





Program Approval Process

BSENG FP approved by BOG	Nov 2002
BSENG FP approved by DPRC	Dec 2002
BSENG Cal. Entry app. UVic Senate	Jan 2003
BSENG FP approved by Minister	Jan 2003
BSENG formally announced	Feb 2003
BSENG FP approved by BOG	Nov 2002



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Target Deadlines

Start with BSENG 1 st and 2 nd year	Sep 2003
BSENG Revised Calendar Entry	Oct 2003
Revised 1 st Year of Engineering	Sep 2004
Common Eng/CSC/Math Co-op	Sep 2004
Accreditation by CEAB CSAC	Oct 2005



E SENS

Summary

- Attractive program for students
- Interdisciplinary program
- Accreditable program
- Compatible with bridge from university colleges into Third Year Engineering
- Mandatory, flexible co component
- New and changed courses
- Leverage many existing courses and resources
- Opportunity to fix issues in other programs
- Balanced implementation with SENG, ECE, CSC, MECH components



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Summary

- Plenty of electives
- Complementary studies
- Plenty of math
- Basic science components
- Capstone project
- Exciting program
- The most attractive SE program in Canada
- Software engineering administrative structure





Thank you!

Questions?

