Computer Science, Software Engineering, Computer Engineering, and Computing Technology – What are the Differences?

At the University of Ottawa we have four alternatives if you want to learn about computing and computers:

• **Regardless of which alternative you choose, you will learn about:**
- The <u>basics</u> of *programming*, *software design*, and *data structures*.
- The <u>basics</u> of *computer hardware* and *software engineering*.
- The mathematics central to computing: logic and discrete mathematics

• *Computer science* **is for students who want:**
- To have more <u>flexibility</u> in their program than is available in the engineering programs.
- To learn a wider variety of *programming languages* and the concepts underlying them.
- To learn more about the underlying science and mathematics of computing, including algorithm design.
- To be able to explore a wider <u>variety of specialized and cutting-edge fields</u> such as artificial intelligence, DNA computing, computer security, graphics for game design, advanced algorithm design, etc.

    You can do a full four-year honours degree, or else simply a major or minor in Computer Science.

• *Computing technology* **is a scaled down version of Computer Science:**
    It is designed to allow you to <u>program computers in any other discipline</u>; it involves one year's worth of courses and leaves out such things as calculus (you may end up taking this in your other discipline anyway).

    You can take our minor in Computing Technology along with a program in the Arts or Social Sciences.

    We also have versions of Mechanical, Civil, Electrical and Chemical Engineering that give you both an engineering degree and a computing technology degree, after 5 years of study.

• **Either the** *Software Engineering* **or** *Computer Engineering* **program are for students who want:**
- To be able to be <u>licensed as engineers</u> (after graduating and obtaining several years experience).
- To focus on <u>engineering design</u>: Applying science and technology for the production of products within economic and other constraints.

• *Software engineering* **is for students who want:**
- To focus on design and the development of <u>large industrial software systems</u>, including how to specify requirements, how to put systems together from software components, how to use software design tools and methods in depth, and how to test software effectively and assure its quality.
- To learn more programming and databases than computer engineering, but less computer hardware.
- To learn about <u>software project management</u> in some depth.
- To take our new <u>Biomedical Option</u>, which includes the pre-requisites for most medical schools.

• *Computer engineering* **is for students who want:**
- To learn much more than the other programs about <u>computer hardware architectures</u>, <u>computer networking</u>, and the design of systems that <u>combine hardware and software</u>.
- To cover more <u>electrical engineering</u> topics than in the other programs.

It is usually possible to transfer among Computer Science, Computer Engineering and Software Engineering at the end of first year. Computer science is accredited by the Canadian Information Processing Society, while Software and Computer Engineering are accredited by the Canadian Engineering Accreditation Board.

You can learn about <u>business</u> in conjunction with computing, by taking the Engineering Management and Entrepreneurship option of Software Engineering and Computer Engineering, or else the Information Management Systems option of Computer Science.

Although there was a downturn in the computer industry a few years ago, there is now a looming shortage of computer professionals, so jobs should be readily available no matter which alternative you choose.
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