COMPUTER ENGINEERING (CPEG)

CPEG 2245 Digital Design I **3 Credits**
Corequisite: CPEG 2245L.
An introduction to computer hardware design. Topics include: digital design principles, Boolean algebra, combinational logic design, sequential logic design, registers, counters, memory, multiplexers, finite state machines, radix conversion, and programmable logic devices. Students learn to write, implement, and simulate elementary digital design. Previously CR 0245.

CPEG 2245L Digital Design I Lab **1 Credit**
Fee: $100 Engineering Lab Fee
Corequisite: CPEG 2245.
This lab course covers the practical aspects of digital logic design. Students design and implement logic circuits using techniques taught in CPEG 2245. Students gain experience using state of the art design software and development boards, which use modern field programmable gate array (FPGA) technology. Previously CR 0245L.

CPEG 3246 Digital Electronics Design II **3 Credits**
Prerequisite: CPEG 2245.
This course examines computer architecture implemented using a hardware design language and programmable logic devices. Students learn the VHDL hardware description language, and learn to use modern design, simulation, and synthesis software. Students design, verify, build and test digital logic circuits using industry standard development boards, and field programmable gate array (FPGA) technology. Graduate equivalent: ECEG 5406. Previously CR 0246.

CPEG 3331 Biomedical Signal Processing **3 Credits**
Prerequisites: CPSC 1131 or SWEG 5407; MATH 1142.
This course presents an overview of different methods used in biomedical signal processing. Signals with bioelectric origin are given special attention and their properties and clinical significance are reviewed. In many cases, the methods used for processing and analyzing biomedical signals are derived from a modeling perspective based on statistical signal descriptions. The purpose of the signal processing methods ranges from reduction of noise and artifacts to extraction of clinically significant features. The course gives each participant the opportunity to study the performance of a method on real, biomedical signals. Graduate equivalent: ECEG 5331. Previously CR 0331.

CPEG 3346 Computer Systems Architecture **3 Credits**
Prerequisite: CPEG 2245.
This course introduces the machine language and various components of a computer hardware in modern computer systems. The course focuses on CPU, memory, bus, cache, I/O module, internal data representation, and instruction set design. It also covers pipelining, superscalar architecture, reduced instruction set computers, parallel architectures, and interconnection networks. Graduate equivalent: ECEG 5346. Previously CR 0346.

CPEG 4320 Computer Networks **3 Credits**
Prerequisites: CPSC 1131, MATH 4351.
This course covers principles of networking and network programming. Topics include OSI layers, elementary queuing theory, protocol analysis, multi-threading, command-line interpreters, and monitors. Students write a distributed computing system and check their performance predictions with experiments. Graduate equivalent: ECEG 5460. Previously CR 0320.

CPEG 4325 Computer Graphics **3 Credits**
Prerequisite: CPSC 1131.
This course supports the visualization and computer systems domain, offering an introductory treatment to two-dimensional and three-dimensional computer graphics concepts. Students write computer games and employ their knowledge to imbue them with realism. High performance rendering uses the latest in cutting edge hardware-accelerated graphics processors. Graduate equivalent: ECEG 5325. Previously CR 0325.

CPEG 4332 Biomedical Imaging **3 Credits**
Prerequisite: BIEG 3331 or CPEG 3331.
The fundamentals and applications of medical imaging techniques will be presented, including x-ray and computed tomography, nuclear imaging, ultrasound, and MRI. Image processing and analysis techniques will be introduced through suitable programming exercises. Graduate equivalent: ECEG 5332. Previously CR 0332.

CPEG 4333 Biomedical Visualization **3 Credits**
Prerequisite: CPSC 1131.
This course is an introduction to 3-D biomedical visualization. Various technologies are introduced, including ultrasound, MRI, CAT scans, PET scans, etc. Students will learn about spatial data structures, computational geometry and solid modeling with applications in 3-D molecular and anatomical modeling. Graduate equivalent: ECEG 5333. Previously CR 0333.