Alexander College
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CURRICULUM GUIDE: OFFICIAL COURSE OUTLINE

Course Code	CPSC 250	Course Title	Introduction to Computer Architecture			
Credit Value	3	Department	Mathematics and Science			
No. of weeks	14	Hrs. per week	*Lecture*	*Tutorial*	*Laboratory*	*Total*
			3	0	1	4
Course Description	This course introduces the fundamental computer organization and instruction set architecture concepts. Particular emphasis is given to the organization and design of the major components of modern digital computers. Topics include: processor organization, control logic design, pipelining, memory hierarchy, input/output control and devices, instruction set design, and architectural support for operating systems and programming languages. A hardware description language will be used as a tool to express and work with design concepts. Preclusion: Students with credit for CPSC 295 may not take CPSC 250 for further credit.					
Prerequisite(s)	ENGL 098, CPSC 150					

Initial Articulation Targets	*UBC*	*SFU*	*UVic*	*UNBC*	*TRU*
	CPSC 2nd (3)	CMPT 250 (3) - Q	CSC 2XX (1.5)	CPSC 231 (4)	COMP 2XXX (3)
	For updated information on the transferability of this course, please consult the BC Transfer Guide, www.bctransferguide.ca				

Learning Outcomes

Upon successful completion of this course, the student will be able to:

- Explain the importance of computer architecture
- Understand the principles and methodology of digital logic design at the gate level, including both combinational and sequential logic elements
- Understand the main components in a modern computer
- Describe how various computer components interact in order to exchange information
- Describe several types of memory used in a computer (e.g. cache, main memory, virtual memory), their hierarchy, and their functions as parts of a system
- Understand the process of translation required for the execution of an instruction-level assembly language
- Understand some of the techniques used to improve the performance of a computer architecture: pipelining, multithreading, parallelism, etc.

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<table>
<tr><td>Content</td><td colspan="3">Core topics – all of the following will be covered:
Overview of the organization and architecture of computer components
Review of Boolean algebra as related to designing computer logic, using simple combinational and sequential logic circuits
Processor architecture: structure and function, basics of computer arithmetic, Integer and floating-point operations, addressing modes and instruction set architecture
Performance enhancement: pipeline design, instruction level parallelism, multi-core chips and thread level parallelism
Data path and control unit design
Memory hierarchy: registers, cache memory, main memory, virtual memory, and secondary memory
Input / Output Interfaces: bus concepts, interrupts, serial and parallel I/O, Direct Memory Access
Introduction to the design of assembly language instruction sets.
Additional topics may also be covered, at the discretion of the instructor.</td></tr>
<tr><td>Methods of Instruction</td><td colspan="3">Lectures, assignments, computer laboratory work, projects, assigned reading, quizzes, examinations</td></tr>
<tr><td>Required Textbook(s)</td><td colspan="3">The following textbook(s) is/are required, or approved equivalent(s).

Patterson, David and John Hennessy. Computer Organization and Design: The Hardware/Software Interface. 2nd ed., Morgan Kaufmann, 2020.

Stallings, William. Computer Organization and Architecture. 10th ed., Pearson Education Publishing, 2016.</td></tr>
<tr><td>Required Equipment and Technology</td><td colspan="3">Students are required to have a computer with internet access.
The following resources are provided by the College:
Office 365
Student email</td></tr>
<tr><td>Homework Hours</td><td colspan="3">At minimum, students can expect one hour of homework for every hour of instructional time.</td></tr>
<tr><td rowspan="5">Evaluation</td><td>Component</td><td colspan="2">% Value</td></tr>
<tr><td>Assignments and quizzes</td><td colspan="2">10-20%</td></tr>
<tr><td>Labs and projects</td><td colspan="2">10-20%</td></tr>
<tr><td>Midterm examinations (1-2)</td><td colspan="2">20-40%</td></tr>
<tr><td>Final examination</td><td colspan="2">30-35%</td></tr>
<tr><td>Completion Requirements</td><td colspan="3">The minimum grade to pass this course is D (50%). Unless otherwise stated, a minimum grade of C- (55%) is required for this course to fulfil a prerequisite.</td></tr>
<tr><td>Course Designer(s)</td><td>Ahmed Malki, Ph.D., Department of Computer Science, Alexander College</td><td>Consultant(s), if applicable</td><td>John Edgar, M.Sc. School of Computing Science, Simon Fraser University</td></tr>
<tr><td>Dean’s Approval</td><td>Barbara Moon, Ph.D., Dean of Arts and Sciences, Alexander College</td><td>Dean’s Approval Date</td><td>October 16, 2019</td></tr>
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Curriculum Committee Approval Date	October 16, 2019	First Term Offered	Winter 2021
Last Review Date	July 29, 2024	Next Review Date	July 29, 2029
Revision History	July 29, 2024 - Minor updates to textbooks by Kelly Cheung.		

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