Alexander College
YOUR ROAD TO UNIVERSITY STARTS HERE!

CURRICULUM GUIDE: OFFICIAL COURSE OUTLINE

Course Code	CPSC 150	Course Title	Computer Organization and Logic Design			
Credit Value	3	Department	Mathematics and Science			
No. of weeks	14	Hrs. per week	*Lecture*	*Tutorial*	*Laboratory*	*Total*
			3	0	0	3
Course Description	This course introduces the internal operation of computer systems. Topics include: Boolean algebra and combinational and sequential logic design, basic computer system organization, processor, memory, and input/output, information representation: number systems, integer floating point representation and character encoding, and an introduction to assembly language programming.					
Prerequisite(s)	ENGL 098 and CPSC 111 *(CPSC 115/ MATH 115 is strongly recommended)*					

Initial Articulation Targets	*UBC*	*SFU*	*UVic*	*UNBC*	*TRU*
	CPSC 1ST (3)	CMPT 150 (3)	CSC 1XX (1.5)	CPSC 230 (4)	COMP 2130 (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:

- Describe how computers represent and manipulate various data types
- Demonstrate an understanding of computer arithmetic and convert between different number systems
- Demonstrate how fundamental high-level programming constructs are implemented at the machine-language level
- Write an assembly language program that can input, process, and output results
- Demonstrate an understanding of basic computer architecture
- Use Boolean algebra as related to designing computer logic, through simple combinational and sequential logic circuits
- Describe how a CPU performs instructions during the fetch-decode-execute cycle and how the memory supports its actions.

Content

Core topics – all of the following will be covered:

- Introduction to basic CPU architecture, addressing modes and program execution
- Data representation: number systems, integer floating point representation, character encoding
- Introduction to Boolean algebra
- Combinational logic design and applications: adders, encoders, decoders, multiplexers, etc.
- Sequential logic design and applications: flip-flops, registers, and finite state machines
- Control: data path construction, buses and microprogrammed control

Alexander College
Main Campus 4805 Kingsway, Burnaby, BC V5H 4T6
www.alexandercollege.ca

<table>
<tr><td></td><td colspan="3">

- Memory devices: read-only memory (ROM), random access memory (RAM)
- Introduction to Assembly language programming: branching, iteration, and subroutines.

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).

Morris Mano, M. and Charles R. Kime. Logic & Computer Design Fundamentals. 5th Ed., Pearson Publishing, 2016. ISBN-13: 9780133760637

Supplemental Text:

Capilano Computing Systems. Logicworks 5: Interactive Circuit Design Software. Prentice Hall, 2003. ISBN-13: 9780131456563, Manual & software for digital hardware simulation for installation on laptops with MS Windows</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="2">Evaluation</td><td>Component</td><td colspan="2">% Value</td></tr>
<tr><td>Assignments and quizzes
Labs and projects
Midterm examinations (1-2)
Final examination</td><td colspan="2">10-20%
10-20%
20-40%
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>
<tr><td>Curriculum Committee Approval Date</td><td>October 16, 2019</td><td>First Term Offered</td><td>Fall 2020</td></tr>
<tr><td>Last Review Date</td><td>July 29, 2024</td><td>Next Review Date</td><td>July 29, 2029</td></tr>
</table>

Revision History	July 29, 2024 - Added 1 lab hour and revised evaluation ranges by Kelly Cheung.