De La Salle University
College of Computer Studies
Computer Technology Department

Course Code	:	**CSARCH2**
Course Title	:	Computer Organization and Architecture 2
Type of Course	:	Foundation course
Pre-requisites	:	CSARCH1
Co-requisite	:	LBYARCH
Pre-requisite to	:	--
Term / Academic Year	:	Term 1, AY 2020-2021
Class Schedule	:	Please refer to Animospace
Instructor	:	
Consultation Hours	:	via AnimoSpace
Course Site / Repository	:	DLSU.Instructure.com
Course Group	:	DLSU.Instructure.com

Course Description
This course is the second part of the computer systems architecture series. In this course, learners will discover the functions of various components of a Von Neumann Architecture-based computer system such as memory, processor and I/O. At the end of the course, learners will have a deeper understanding of the computer systems and apply this knowledge to improve other computing fields.

Learning Outcomes (LO)
Upon completion of this course, the student is expected to be able to do the following:

Expected Lasallian Graduate Attributes	**Learning Outcomes**
Critical and Creative Thinker, Reflective Lifelong Learner	**LO1.** Describe how different data types are represented in the memory **LO2.** Describe the fundamental concepts of cache memory **LO3.** Describe the various algorithms related to arithmetic and logic unit **LO4.** Demonstrate how instructions are processed in the processor **LO5.** Describe the fundamental concepts of I/O organization

Major Course Outputs (MCO)
As evidence of attaining the above learning outcomes, the student is required to do and submit the following during the indicated dates of the term.

Learning Outcome	**Required Output**	**Due Date**
LO5	MCO1. I/O peripheral case project	Week 6
LO1, LO2, LO3, LO4	MCO2. ALU simulation project	Week 14

Although major course outputs are done either individually or collaboratively in groups. In group work, every student is expected to contribute to his/her group's work and will be graded accordingly. All group members are also expected to keep track of their own work contributions and should be ready to discuss these with the teacher whenever the need arises.

Rubrics for Assessment
To be announced in class

Other Requirements and Assessments
The course has the following requirements on top of the two major course outputs described above:

1. Departmental Exams
2. Seatwork

Grading System
To pass this course, one must accumulate at least **60** points through the course requirements discussed above.

Assessment Task	**Maximum Points**
Average of Department Exams	50
Short quiz	10
MCO 1 – I/O peripheral case project	20
MCO 2 – Simulation project	20
TOTAL POINTS	**100**

Teaching Methods/Strategies

1. Asynchronous online session
2. Synchronous online session

Learning Plan

Learning Outcomes	**Topics and Readings**	**Week/Date**	**Learning Activities**
	Course Orientation • Syllabus, Requirements, Class Policies • Introduction to computer organization and architecture	1	* Course introduction * Setting of Classroom policies
LO1	Spiral review: Positional number system • Positional number system • Number system base conversion • Binary data organization • 2^x and 10^y ambiguity	1	* video / lecture * short quiz
LO1	Spiral review: integer data representation • Unsigned integer representation • Signed integer representation • Integer operation and overflow	2	* video / lecture * short quiz
LO1	Decimal data representation • BCD (packed, unpacked, densely packed)	3	* video / lecture * short quiz
LO1	Floating-point data representation • Single/double-precision binary floating-point representation • Single/double-precision decimal floating-point precision • Floating-point rounding • Floating-point operation and guard bit	3-4	* video / lecture * short quiz
LO1	Character representation • ASCII	5	* video / lecture * short quiz

	• Unicode		
	Activity: 1st Exam (Nov 24, 2020)	6	* Exam
LO5	Activity: I/O peripheral case project (Nov 26, 2020)	6	* MCO1 - Case report
LO2	Computer subsystem: Cache Memory • Cache mapping function • Cache replacement algorithm	7-9	* video / lecture
	Activity: 2nd Exam (Dec 17, 2020)	9	* Departmental exam
LO3	Computer subsystem: Arithmetic & Logic Unit • Different algorithms related to binary integer multiplication • Different algorithms related to binary integer division	10	* video / lecture * short quiz
LO4	Computer subsystem: Processor • Microprogramming	11	* video / lecture * short quiz
	Activity: 3rd Exam (January 19, 2021)	12	* Exam
LO5	I/O Organization	13	* video / lecture
	Activity: Simulation Project (Feb 1, 2021)		* Project demo

References

Hennessy, J.L., & Patterson D.A. (2018). Computer Organization and Design: A Hardware/Software Approach (RISC-V Edition). Cambridge, MA: Morgan Kaufmann Publishers. [QA 76.9 C643 H46 2018]

Hamacher, V.C., Vranesic, Z.G. & Manjikian, N. (2012). Computer Organization and Embedded Systems (6th Edition). McGraw-Hill International Edition. [QS 76.9 C643.H36 2012]

Mano, M.M., & Ciletti, M.D. (2013). Digital Design: with an introduction to the Verilog HDLM (5th edition). Upper Saddle, N.J.: Pearson Education, Inc. [TK 7888.3 M3 2013]

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