INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

DPT TELECOMMUNICATIONS SERVICES ET USAGES
INSA Campus LyonTech - Bâtiment Hedy Lamarr
6 avenue des Arts - 69621 VILLEURBANNE
Tel. 0472436060

Informatique

Assembly Programming

IDENTIFICATION

CODE : IST-4-ASM
ECTS : 3.0

HORAIRES

Cours :	0.0 h
TD :	20.0 h
TP :	0.0 h
Projet :	0.0 h
Face à face pédagogique :	20.0 h
Travail personnel :	20.0 h
Total :	40.0 h

ÉVALUATION

- Mixed written+practical exam (laptops allowed) in the last 2h session

SUPPORTS PÉDAGOGIQUES

LANGUE D'ENSEIGNEMENT

Anglais

CONTACT

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OBJECTIFS RECHERCHÉS PAR CET ENSEIGNEMENT

The aim of this course is to acquire a concrete understanding of what it means to "execute" a "program" on a "computer". What is an "instruction" ? What is "a variable" ? What does "the processor" do ? What does "assembly programming" mean ? This course is neither a "computer architecture" course (we will *not* discuss implementation details of the hardware) nor an "operating systems" course (we will not talk about advanced topics such as virtual memory or process context switching).

PROGRAMME

- Information coding: binary numbers, hexadecimal, ascii
- Binary Arithmetics: addition, subtraction, multiplication, two's complement encoding
- The von Neumann Architecture: CPU+Memory, machine language vs assembly, immediates
- Control Flow: control structures (loops, alternatives), mandatory vs conditional jumps, breakpoints
- Addressing modes and memory instructions: direct vs indirect, indexed addressing
- Memory-mapped input/output: peripheral interface through load/store
- Subroutines: call protocol, return address, parameter passing, calling conventions
- The Execution Stack: push/pop instructions, stack pointer, register spilling
- Recursion: Application Binary Interface, fixed/caller-saved/callee-saved/scratch registers

BIBLIOGRAPHIE

- Patterson and Hennessy, Computer Organization and Design: The Hardware/Software Interface

PRÉ-REQUIS

- High school maths: integer arithmetics, boolean logic
- A laptop with Python installed (python 3.6+)