

SYLLABUS

Matière : TD Microprocessor and Microcontroller

Domaine: Science and technology

Filière: Automation

Spécialité : L3 Automation

Semestre: S6

Année Universitaire: 2025/2026

Intitulé : Microprocessor and Microcontroller

Unité d'enseignement : UEF 3.1.2

Nombre de Crédits : 6

Coefficient : 3

Volume horaire hebdomadaire total : Cours (nombre d'heures par semaine) : 1h30

Travaux dirigés (nombre d'heures par semaine) : 1h30

Travaux pratiques (nombre d'heures par semaine) : 1h30

Responsable de la matière d'enseignement

Nom, Prénom, Grade: MERABTI Nardjes ; MCB

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Horaire et lieu du cours: Mardi 09h45 Audit3 /TD: Jeudi : 9h45--13h00 H13 / TP: Mardi: 11h15-15h30 Info 2

Description de la matière d'enseignement

This course introduces students to the fundamental concepts of microprocessors and microcontrollers, focusing on their architecture, operation, and programming. It covers the structure and functioning of these components, instruction sets, memory types, interrupt handling, and input/output interfaces.

◆ Recommended Prerequisite Knowledge:

Combinational and sequential logic, Basic programming concepts.

◆ General objective

The general objective of these tutorials is to enable students to progressively apply the theoretical concepts of microprocessors and microcontrollers through practical exercises.

Contenu de la matière d'enseignement

The tutorials are organized progressively according to the different parts of the course. First, the tutorials focus on **microprocessor architecture**: students learn to identify and describe the internal and external components of a microprocessor, compare different architectures (Harvard, Von Neumann), and analyze simplified functional diagrams.

The second part is devoted to the **study of the instruction set and interrupts**. analyze the architecture of a typical intel 8085 microprocessor, and explore its integrated peripherals. Students manipulate assembly instructions through translation and classification exercises, explore different addressing modes, and design short simple programs (addition, data transfer).

Next, the tutorials address **memory systems**. Students distinguish between the main memory technologies (ROM, RAM, EEPROM, Flash), calculate the addressing requirements for different memory sizes, and carry out memory mapping exercises.

The fourth part is dedicated to **interfaces**, with a focus on the study of communication schemes.

Finally, a significant part of the tutorials is reserved for the **microcontroller**. Students learn to differentiate between microprocessors and microcontrollers, analyze the architecture of a typical PIC16F84 microcontroller, and explore its integrated peripherals. Through practical exercises, they write short programs to control input/output (e.g., LED blinking) and use interrupts (e.g., timer).

Modalités d'évaluation

Nature du contrôle	Pondération en %
Examen	60%
Micro – interrogation	
Travaux dirigés	
Travaux pratiques	
Projet personnel	
Travaux en groupe	
Sorties sur terrains	
Assiduité (Présence /Absence)	
Control continu	40%
Total	100%

Références & Bibliographie

1. A. Farouki, T. Laroussi, T. Benhabiles, « Microprocesseurs 8086 », Univ. Constantine.
2. J. Y. Haggège, « Microprocesseur : Support de cours », INSET, 2003.
3. Lilen, « Cours fondamental des microprocesseurs », Dunod, 1993.
4. Alain-Bernard Fontaine, « Le Microprocesseur 16 bits-8086-8088 », 2ième édition, Manuels informatiques», Masson, 1997.
5. Michel Aumiaux, « Microprocesseurs 16 bits », 1997.
6. J. Crisp,« Introduction to microprocessors and microcontrollers», Elsevier, 2nd edit 2004.
7. Christian Tavernier, « Microcontrôleurs PIC 10, 12, 16, Description et mise en œuvre », Dunod, 2007.
8. Pascal Mayeux, « Apprendre la programmation des PIC Mid-Range par l'expérimentation et la simulation », Dunod, 2010.