

Course Title:	Mathematic Lab
Course Code:	CSE113
Program:	Master Degree In Computer Engineering
Department:	Computer Engineering
Course coordinator:	Dr. DALLALI Adel
Institution:	Private Higher School of Engineers of Gafsa (ESIP)

A. Course identification

1. Credit hours: 1.5 (0-0-1,5)			
2. Course type			
a. College Department Others			
b. Fundamental Transversal Optional			
3. Level/year at which this course is offered: 1.1/3			
4. Pre-requisites for this course (if any): -Basic knowledge of linear algebra (matrices, vectors,			
matrix operations).			
- Introduction to programming (syntax, variables, loops, functions).			
- Fundamental concepts of signal processing (signals and mathematical representation)			

1. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Self- study	Total workload
1	Traditional classroom			
2	Blended	22.5		
3	E-learning		12.5	35
4	Distance learning		9 T	/ 0
5	Other ()	re0	í In	genieurs

2. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	00
2	Laboratory/Studio	22.5
3	Tutorial	00
4	Others (specify)	-
	Total	22.5



B. Course Objectives and Learning Outcomes

Course Description

This course introduces students to MATLAB as a computational tool for engineering mathematics applications. Students will learn fundamental MATLAB functions, signal generation, Fourier analysis, and spectral analysis. By the end of the course, students will be able to apply MATLAB for mathematical modeling and problem-solving.

Course Main Objectives

- ✓ Understand the interface and basic features of MATLAB.
- ✓ Execute commands and manage variables efficiently.
- ✓ Implement MATLAB scripts and functions to automate calculations
- ✓ Create basic signals (pulses, steps, sinusoids, random signals).
- ✓ Learn techniques for sampling, quantization, and signal reconstruction for digital systems.
- ✓ Decompose a signal into a Fourier series and interpret the coefficients.
- \checkmark Apply DFT to study the influence of noise and sampling conditions on a signal
- ✓ Compute the autocorrelation function for deterministic and random signals.

1. Course Learning Outcomes

CLOs		Aligned PLOs
	Knowledge and understanding	
1.1	 ✓ Understand MATLAB's role in computational mathematics and apply its basic functions. 	PLO.K1
	Skills	
2.1	 Develop problem-solving strategies using MATLAB for engineering applications. 	PLO.S1
7.1	✓ Analyze and evaluate mathematical models and numerical computations in MATLAB.	PLO.S5

C. Course Content Privée de Gafsa

No	List of Topics	Contact Hours
1	 TP1: Introduction to MATLAB ✓ Basics of MATLAB, variables, matrices, and graphical functions. 	4
2	 TP2: Signal Generation: ✓ Creating unit impulses, periodic signals, and random signals. Examples of Fourier Transform for continuous-time signals. 	5



No	List of Topics	Contact Hours
3	 TP3: Fourier Analysis: ✓ Computing Fourier series and spectral analysis of signals. Applications of distributions in physical system modeling and signal processing. 	4
4	TP4: Discrete Fourier Transform:✓ Using DFT for spectral analysis and studying noisy signals.	5
5	TP5: Autocorrelation and Signal Estimation:✓ Estimating correlation functions and numerical evaluation.	4.5
Total		22.5

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding		
PLO.K1	 ✓ Understand MATLAB's role in computational mathematics and apply its basic functions. 	- Lecturing - Class discussions	AssignmentsQuizzesExams
2.0	Skills		
PLO.S1	 ✓ Develop problem-solving strategies using MATLAB for engineering applications. 	 Lecturing Class discussions projects 	- Assignments, - Quizzes - Exams
PLO.S5	 Analyze and evaluate mathematical models and numerical computations in MATLAB 	 Lecturing Class discussions projects 	- Assignments - Quizzes - Exams
Ecole Superioure a Ingeniours			

2. Assessment Tasks for Students

	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Practical Work (written or oral)	Weekly	15 %
2	Quizzes, Homework assignments	Random	10%
3	First mid Term	-	00%
4	Final Exam	16	75%

E. Student Academic Counselling and Support



Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

1- Office hours

2- Blackboard interface

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	 Moore, Holly. MATLAB for Engineers. 2nd ed., Pearson, 2015. Orfanidis, Sophocles J. Introduction to Signal Processing. Prentice Hall, 1996. Alan V. Oppenheim & Ronald W. Schafer, Digital Signal Processing. Pearson, 2010. 	
Essential References Materials	 MATLAB official documentation and tutorial resources from MathWorks. Signal Processing Toolbox user guides and resources. 	
Electronic Materials	 MATLAB Online: For cloud-based access to MATLAB. Coursera for additional learning on MATLAB and signal processing basics. 	
Other Learning Materials	NA	

2. Facilities Required

Item	Resources	
	Classroom board	
Accommodation	Computer lab with the necessary software	
	Internet access	
Technology Resources	Data projector	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Students, Faculty, Program Leaders, Peer Reviewer	Direct/Indirect
Extent of achievement of course learning outcomes.	Faculty, Program Leaders, Peer Reviewer	Direct, Indirect
Quality of Learning resources	Faculty, Program Leaders, Peer Reviewer	Direct, Indirect
Teaching and learning quality and effectiveness.	Students, Faculty Program Leaders, Peer Reviewer	Direct, Indirect



H. Specification Approval Data

Council / Committee	Computer Engineering Council
Date	11/09/2023

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