الجمهورية الجزائرية الديمقراطية الشعبية
People's Democratic Republic of Algeria
وزارة التعليم العالي والبحث العلمي
Ministry of Higher Education and Scientific Research
اللجنة البيداغوجية الوطنية لميدان العلوم والتكنولوجيا
National Pedagogical Committee for the Field of Science and Technology

Harmonized Academic Master

National Program

2025- 2026

Establishment	Faculty / Institute	Department
University of Médéa	***Technology***	***Civil Engineering***
Field	**Stream**	**Specialty**
Science and Technology	***Civil Engineering***	***Structures***

I – Master Program Identity Sheet

Admission Requirements

Field	Harmonized Master	Licenses Granting Access to the Master	Ranking According to License Compatibility	Coefficient Assigned to License
Civil Engineering	Structures	Civil Engineering	1	1.00
		Public Works	2	0.80
		Mechanical Construction	3	0.70
		Other Licenses in the ST field	5	0.60

II – Semester Organization Sheets for the Specialty Courses

Semestre 1 : Master Structures

Study Units	Materials	Credits	Coefficient	Weekly hours			Semester Hours (15 weeks)	Additional Work Consulting (15 weeks)	Evaluation mode	
	Title			**Course**	**Tut**	**PW**			Continuous control	**Exam**
Fondamental SU Code : FSU 1.1.1 Credits : 8 Coefficients : 4	Structural Mechanics	4	2	1h30	1h30		45h00	55h00	40%	60%
	Structural Dynamics 1	4	2	1h30	1h30		45h00	55h00	40%	60%
Fondamental SU Code : FSU 1.1.2 Credits : 10 Coefficients : 5	Reinforced Concrete Structures 1	4	2	1h30	1h30		45h00	55h00	40%	60%
	Steel Structures	6	3	3h00	1h30		67h30	82h30	40%	60%
Methodological SU Code : MSU 1.1 Credits : 9 Coefficients : 5	**Advanced Programming in Python**	2	2	1h30		1h30	45h00	55h00	40%	60%
	Experimental Methods	2	1			1h30	22h30	27h30	100%	
	Innovative Materials and durability	3	2	1h30		1h30	45h00	55h00	40%	60%
Discovery SU Code : DSU 1.1 Credits : 2 Coefficients : 2	Pathologies and Rehabilitation of Structures	1	1	1h30			22h30	02h30		100%
	Building	1	1	1h30			22h30	02h30		100%
Total semester 1		**30**	**17**	**13h30**	**6h00**	**4h30**	**382h30**			

Semestre 2 Master Structures

Study Units	Materials	Credits	Coefficient	Weekly hours			Semester Hours (15 weeks)	Additional Work Consulting (15 weeks)	Evaluation mode	
	Title			**Course**	**Tut**	**PW**			Continuous control	**Exam**
Fondamental SU Code : FSU 1.2.1 Credits : 11 Coefficients : 5	Elasticity	6	3	3h00	1h30		67h30	82h30	40%	60%
	Structural Dynamics 2	5	2	1h30	1h30		45h00	55h00	40%	60%
Fondamental SU Code : FSU1.2.2 Credits : 8 Coefficients : 4	Reinforced Concrete Structures 2	4	2	1h30	1h30		45h00	55h00	40%	60%
	Geotechnical Engineering and Foundations	4	2	1h30	1h30		45h00	55h00	40%	60%
Methodological SU Code : MSU 1.2 Credits : 8 Coefficients : 5	Finite Element Method	5	3	1h30	1h30	1h30	67h30	65h00	40% (20%TD+20%TP)	60%
	Construction Project Management	3	2	1h30		*1h30	45h00	55h00	*70%	30%
Discovery SU Code : DSU 1.2 Credits : 3 Coefficients :3	Compliance with Standards and Rules of Ethics and Integrity	1	1	1h30			22h30	02h30		100%
	Elements of Applied AI	2	2	1h30	1h30		45h00	05h00	40%	60%
Total semester 2		**30**	**17**	**13h30**	**7h30**	**4h30**	**382h30**			

***** The practical sessions for the subject **"Metallic Constructions Project"** are supervised in-person sessions conducted in a workshop format. They are not counted as conventional practical work sessions.

Semestre 3 Master Structures

Study Units	Materials	Credits	Coefficient	Weekly hours			Semester Hours (15 weeks)	Additional Work Consulting (15 weeks)	Evaluation mode	
	Title			**Course**	**Tut**	**PW**			Continuous control	**Exam**
Fondamental SU Code : FSU 2.1.1 Credits : 10 Coefficients : 5	Prestressed Concrete	6	3	3h00	1h30		67h30	82h30	40%	60%
	Plasticity and Damage Mechanics	4	2	1h30	1h30		45h00	55h00	40%	60%
Fondamental SU Code : FSU 2.1.2 Credits : 8 Coefficients : 4	Seismic Engineering	4	2	1h30	1h30		45h00	55h00	40%	60%
	Special Structures	4	2	1h30	1h30		45h00	55h00	40%	60%
Methodological SU Code : MSU 2.1 Credits : 9 Coefficients : 5	Reinforced Concrete Structures Project	6	3	1h30		*3h00	67h30	82h30	*70%	30%
	Structural Modeling	3	2			3h00	45h00	37h30	100%	
Discovery SU Code : DSU 2.1 Credits:3 Coefficients : 3	Documentary Research and Thesis Design	1	1	1h30			22h30	02h30		100%
	Reverse Engineering	2	2	1h30	1h30 Workshop		45h00	05h00	40%	60%
Total semester 3		**30**	**17**	**12h00**	**6h00**	**7h30**	**382h30**			

***** The practical sessions for the subject **"Reinforced Concrete Structures Project"** are supervised in-person sessions conducted in workshop format. They are not counted as conventional practical work sessions.

Elective Subjects for the Discovery Study Units (DSU) – Semesters S1, S2, S3

1. *Building*
2. *Roads and Miscellaneous Networks*
3. *Natural and Technological Risks*
4. *Public Procurement Code*
5. *Pathologies and Rehabilitation of Structures*
6. *Building Thermal Performance*
7. *General Construction Processes*
8. *Project Planning and Management*
9. *Business Organization and Management*
10. *Construction Site Organization*
11. *Introduction to Hydrotechnical Works*
12. *Introduction to Civil and Industrial Constructions*

Semester 4

Internship in a company or a research laboratory, assessed through a report and an oral defense.

	VHS	Coeff	Credits
Personal Work	550	09	18
Internship in a Company or Laboratory	100	04	06
Seminars	50	02	03
Other (Supervision)	50	02	03
Total Semester 4	750	17	30

This table is given as indicative.

Master Final Project Evaluation

- Scientific Value (Jury Assessment) – /6
- Thesis Writing (Jury Assessment) – /4
- Presentation and Response to Questions (Jury Assessment) – /4
- Supervisor's Assessment – /3
- Internship Report Presentation (Jury Assessment) – /3

III – Detailed Program by Subject for Semester 1 (S1)

Semester 1

FSU 1.1.1 – Structural Mechanics

Total Hours: 45h00
Credits: 4
Coefficient: 2

- Chapter 1: Introduction to Structural Analysis
- Chapter 2: Differential Relationships and Energy Methods
- Chapter 3: Force Method
- Chapter 4: Displacement Method
- Chapter 5: Iterative Methods
- Chapter 6: Continuous Beams on Elastic Supports
- Chapter 7: Analysis of Arch Structures

FSU 1.1.1 – Structural Dynamics I

Total Hours: 45h00
Credits: 4
Coefficient: 2

- Chapter 1: Introduction and General Concepts
- Chapter 2: Single Degree of Freedom Systems
- Chapter 3: Multi-Degree of Freedom Systems

FSU 1.1.2 – Reinforced Concrete Structures I

Total Hours: 45h00
Credits: 4
Coefficient: 2

- Chapter 1: Design of Slabs and Flat Slabs
- Chapter 2: Design of Reinforced Concrete Frames under Vertical Loads
- Chapter 3: Design of Frames under Horizontal Loads
- Chapter 4: Regulatory Provisions for Columns and Beams
- Chapter 5: Shallow Foundations

FSU 1.1.2 – Steel Structures

Total Hours: 67h30
Credits: 6
Coefficient: 3

- Chapter 1: Design and Calculation of Beam-to-Column Connections
- Chapter 2: Design and Calculation of Column Bases
- Chapter 3: Design and Calculation of Crane Runway Beams
- Chapter 4: Composite Floors (Steel–Concrete)
- Chapter 5: Steel Frame Structures
- Chapter 6: Methods of Analysis of Steel Structures

DSU 1.1.1 – Advanced Programming in Python

Total Hours: 45h00
Credits: 2
Coefficient: 2

- Chapter 1: Review of Python Programming
- Chapter 2: Programming and Automation
- Chapter 3: Advanced Excel Training
- Chapter 4: GanttProject Training
- Chapter 5: Advanced Object-Oriented Programming
- Chapter 6: Introduction to Data for Artificial Intelligence

MSU 1.1 – Experimental Methods

Total Hours: 22h30
Credits: 2
Coefficient: 1

- Chapter 1: Tests on Self-Compacting Concrete in the Fresh State
- Chapter 2: Durability Tests on Concrete
- Chapter 3: Mechanical Tests on Mortars and Concrete and Material Valorization

MSU 1.1 – Innovative Materials

Total Hours: 37h30
Credits: 3
Coefficient: 2

- Chapter 1: Eco-Materials
- Chapter 2: Alternative Binders and Substitute Products
- Chapter 3: New Materials
- Chapter 4: Construction Materials and Advanced Concrete Technologies

IV – Detailed Program by Subject for Semester 2 (S2)

Semester 2

FSU 1.2.1 – Elasticity

Total Hours: 45h00
Credits: 4
Coefficient: 2

- Chapter 1: Fundamental Concepts of Elasticity
- Chapter 2: Stress and Strain Tensors
- Chapter 3: Constitutive Laws
- Chapter 4: Plane Stress and Plane Strain Problems
- Chapter 5: Elastic Problems in Structural Elements

FSU 1.2.1 – Structural Dynamics II

Total Hours: 45h00
Credits: 4
Coefficient: 2

- Chapter 1: Free Vibrations of Multi-Degree Systems
- Chapter 2: Forced Vibrations
- Chapter 3: Modal Analysis
- Chapter 4: Dynamic Response of Structures
- Chapter 5: Introduction to Seismic Design

FSU 1.2.2 – Reinforced Concrete Structures II

Total Hours: 45h00
Credits: 4
Coefficient: 2

- Chapter 1: Shear and Torsion in Reinforced Concrete
- Chapter 2: Slender Columns and Stability
- Chapter 3: Seismic Design of Reinforced Concrete Structures
- Chapter 4: Retaining Structures
- Chapter 5: Advanced Foundation Systems

FSU 1.2.2 – Geotechnical Engineering and Foundations

Total Hours: 45h00
Credits: 4
Coefficient: 2

- Chapter 1: Soil Behavior and Mechanical Properties
- Chapter 2: Bearing Capacity of Soils
- Chapter 3: Settlement Analysis
- Chapter 4: Deep Foundations
- Chapter 5: Soil–Structure Interaction

DSU 1.2.1 – Finite Element Method

Total Hours: 45h00
Credits: 2
Coefficient: 2

- Chapter 1: Fundamentals of the Finite Element Method
- Chapter 2: One-Dimensional Elements
- Chapter 3: Two-Dimensional Elements
- Chapter 4: Application to Structural Analysis

MSU 1.2 – Construction Project Management

Total Hours: 22h30
Credits: 2
Coefficient: 1

- Chapter 1: Project Planning and Scheduling
- Chapter 2: Cost Estimation and Budget Control
- Chapter 3: Risk Management in Construction
- Chapter 4: Quality and Safety Management

V – Detailed Program by Subject for Semester 3 (S3)

Semester 3

FSU 2.1.1: Prestressed Concrete

- **VHS:** 67h30 (Lecture: 3h, Tutorial: 1h30)
- **Credits:** 6
- **Coefficient:** 3
- **Chapter Titles:**
    1. Generalities on Prestressed Concrete
    2. Materials and Equipment Used in Prestressed Concrete
    3. Prestressing Methods
    4. Prestress Losses
    5. Bending of Simply Supported Beams
    6. Continuous Beams on Simple Supports
    7. Resistance to Shear and Torsion
    8. Justification of Special Sections

FSU 2.1.1: Plasticity and Damage Mechanics

- **VHS:** 45h00 (Lecture: 1h30, Tutorial: 1h30)
- **Credits:** 4
- **Coefficient:** 2
- **Chapter Titles:**
    1. Introduction to Inelastic Structural Analysis
    2. Plastic Analysis of Structures
    3. Limit Analysis Applied to Structural Calculations
    4. Damage Mechanics

FSU 2.1.2: Seismic Engineering

- **VHS:** 45h (Lecture: 1h30, Tutorial: 1h30)
- **Credits:** 4
- **Coefficient:** 2
- **Chapter Titles:**
    1. Elements of Seismology
    2. Objectives of Seismic Protection and Design Methods
    3. Characteristics of Earthquake-Resistant Buildings
    4. Classification Criteria
    5. Seismic Force Calculation Rules – Equivalent Static Method
    6. Modal Spectral Dynamic Method
    7. Ductility Concept and Construction Detailing

FSU 2.1.2: Special Structures

- **VHS:** 45h00 (Lecture: 1h30, Tutorial: 1h30)
- **Credits:** 4
- **Coefficient:** 2

- **Chapter Titles:**
    1. Retaining Walls
    2. Domes
    3. Silos
    4. Reservoirs and Water Towers
    5. Reinforced Concrete Bridges

MSU 2.1: Reinforced Concrete Structures Project

- **VHS:** 67h30 (Lecture: 1h30, Lab: 3h00)
- **Credits:** 6
- **Coefficient:** 3
- **Sections:**
    - Project Presentation and Description
    - Presentation of the Calculation Steps
    - Calculation Assumptions
    - Materials Used
    - Standards and Regulations Applied
    - Choice of Structural System (Mixed Structures: Shear Walls + Frames)
    - Preliminary Sizing of Structural Elements and Load Assessment
    - Floor Slab Design
    - Design of Secondary Elements (e.g., Balcony, Parapet)
    - Staircase Design and Reinforcement
    - Seismic Study
    - Design and Reinforcement of the Load-Bearing Structure
    - Foundation Design
    - Production of Drawings (Formwork Plans, Reinforcement Plans, etc.)
    - Conclusions and Perspectives

MSU 2.1: Structural Modeling

- **VHS:** 37h30 (Lab: 2h30)
- **Credits:** 3
- **Coefficient:** 2
- **Chapter Titles:**
    1. Introduction to Civil Engineering Software
    2. Steps for Modeling a Structure Using Software
    3. Modeling a Reinforced Concrete Structure (Residential or Administrative Building)
    4. Modeling a Steel Frame Structure (Industrial Hangar)

DSU 2.1.1: Documentary Research and Thesis Design

- **VHS:** 22h30 (Lecture: 1h30)
- **Credits:** 1
- **Coefficient:** 1
- **Part I – Documentary Research**
    1. Defining the Topic
    2. Selecting Information Sources
    3. Locating Documents
    4. Processing Information
    5. Presentation of the Bibliography
- **Part II – Thesis/Dissertation Design**
    1. Thesis Plan and Stages
    2. Writing Techniques and Standards
    3. Workshop: Critical Review of a Manuscript
    4. Oral Presentations and Defenses
    5. How to Avoid Plagiarism

DSU 2.1.2: Reverse Engineering

- **VHS:** 45h00 (Lecture: 1h30, Lab: 1h30)
- **Credits:** 2
- **Coefficient:** 2
- **Chapter Titles:**
    1. Introduction to Reverse Engineering
    2. General Methodology
    3. Hardware Reverse Engineering
    4. Software Reverse Engineering
    5. Mechanical Reverse Engineering
    6. Security and Intrusion Detection
    7. Real Case Studies
- **Laboratory/Practical Examples (across four engineering disciplines):**
    - Electrical Engineering: Reverse engineering of electrical devices
    - Mechanical Engineering: Reverse engineering of simple mechanisms
    - Civil Engineering: Analysis of existing structures without plans
    - Process Engineering: Reverse engineering of laboratory or industrial modules