



INSTITUT SUPÉRIEUR POLYTECHNIQUE PRIVÉ  
المعهد العالي الخاص للتقنيات المتعددة



2020  
2021



**Génie Civil**

# ULT Civil Engineering

**Subjects Modules for S1**

**Semester 1 Year 1**

## U1.1: Engineering Tools 1 Engineering Mathematics

Module designation	<b>Engineering Tools 1</b>
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.1
Subtitle, if applicable	-
Courses, if applicable	<b>Engineering Mathematics</b>
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Afef HIDRI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce Math for engineering and application
Type of teaching, contact hours	42 hours, of Integrated Course (Classroom Lecture)
Workload	Total 84Hrs/Semester (42 hours of Self Study)
Credit points	3 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Preparatory Programme (Calculus & Algebra)
Module objectives/intended learning outcomes	<b>Objectives:</b> 1. Understand the Concept of Fourier and Laplace transform 2. Understand the resolution methods for Differential Equations.

Content	<p><b>CHAPTER 1 : Fourier Transform (FT)</b>  Definitions,  Inverse transform,  Different definitions of the FT.,  Transformation of L2 (Plancher and Parseval formula),  Properties of the FT.,  FT of the usual functions.</p> <p><b>CHAPTER 2 : Laplace Transform (LT)</b>  Definitions,  Theorem of the initial value,  Theorem of the final value, Properties of the LT,  LT of the usual functions.</p> <p><b>CHAPITRE 3 : Complex Integrals</b>  Residual theorem,  Cauchy conditions,  Complex logarithmic function,  Cauchy theorem,  Laurent series,  Singularities,  Definition of the residue of f at <math>z_0</math>,  Residual theorem,  Calculation of the residue in the case of a single and multiple pole,  Lemmas of Jordan.</p>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<ul style="list-style-type: none"> <li>[1] Appel Walter, Mathématiques pour la physique, H&amp;K, 2005.</li> <li>[2] Arnaudies Jean-Marie, fraysse Henri, cours de mathématiques, Dunod, 1994.</li> <li>[3] Casquet Claude, witomski Patrick, Analyse de Fourier et applications, Dunod, 1996.</li> <li>[4] Parodi Maurice, mathématique appliquées a l'art de l'ingénieur, Sedes, 1965.</li> <li>[5] Roddier francois, distributions et transformation de Fourier, mc Graw-hil, 1993.</li> </ul>

## U1.1: Engineering Tools 1 Algorithm & C Programming

Module designation	Engineering Tools 1
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.1
Subtitle, if applicable	-
Courses, if applicable	Algorithm & C Programming
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Nada LAHMERI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce computer programming techniques, and applications
Type of teaching, contact hours	32 hours, of Integrated Course (Classroom Lecture) 10 Hours of Workshop
Workload	Total 63Hrs/Semester (21 hours of Self Study)
Credit points	2.5 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic computer system, and programming
Module objectives/intended learning outcomes	<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Students will gain a broad perspective about the uses of computers in engineering.</li> <li>2. Develops basic understanding of the concept of algorithm and algorithmic thinking.</li> <li>3. Develops the ability to analyze a problem, develop an algorithm to solve it.</li> <li>4. To use of the C programming language to implement various algorithms.</li> </ol> <p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Students will demonstrate basic knowledge in fundamentals of algorithms and programming technologies and fundamentals of Computer Science.</li> <li>2. Graduates will be able to demonstrate the ability to design, create a solutions to real problems in the industry.</li> </ol>

Content	<p><b>Chapter 1 Introduction to the concepts of algorithms and C programming</b></p> <p>1.1 Definitions  1.2 How to write an algorithm  1.3 Structure of a C program  1.4 First example</p> <p><b>Chapter 2 Functions and procedures</b></p> <p>2.1 Declaration of a function  2.2 Declaration of a procedure  2.3 Formal parameters and effective parameters  2.4 Passage of parameters  2.5 Use of functions and procedures</p> <p><b>Chapter 2 Tables</b></p> <p>2.1 Definition of a table  2.2 Declaration of a table  2.3 Access to the elements of an array  2.4 Multidimensional arrays  2.5 Use of tables</p> <p><b>Chapter 3 Records</b></p> <p>3.1 Definition of the record data structure  3.2 Declaration of a registration  3.3 Access to the fields of a record  3.4 Use of records</p> <p><b>C PROGRAMMING</b></p> <p><b>Chapter I Basic Elements of the C Language</b></p> <p>1.1 Introduction  1.2 What does a computer include?  1.3. The evolution of programming languages  1.4 Stages of program development  1.5 Programming environment  1.6 The general structure of a program written in C  1.7 Variables  1.8 Constants  1.9 Basic types, Operators and expressions  1.10 Display and entry of variables</p> <p><b>Chapter II Conditional Structures</b></p> <p>2.1. Definition  2.2. The if statement  2.3. The switch... case statement  2.4. Applications</p> <p><b>Chapter III Repetitive Structures</b></p> <p>3.1 Definition  3.2 Using an iterative structure  3.3 while and do ... while statements</p>
Study and examination requirements and forms of examination	Format: Mid-term Exam (25%) + Workshop evaluation 25%+Final Exam (50%)
Media employed	-Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) -Programming Workshop in Computer Lab

Reading list	[1] Harold Abelson, Gerald Jay Sussman, and Julie Sussman. Structure et interprétation des programmes informatiques. InterEditions, 1989. [2] Jean-Luc Chabert, Evelyne Barbin, Michel Guillemot, Anne Michel-Pajus, Jacques Borowczyk, Ahmed Djebbar, and Jean-Claude Martzloff. Histoire d'algorithmes : du caillou à la puce. Belin, 1994.
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## U1.1: Engineering Tools1

### Probability & Statistics

Module designation	Engineering Tools 1
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.1
Subtitle, if applicable	-
Courses, if applicable	Probability & Statistics
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Afef HIDRI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce Probability & Statistics for engineering and application
Type of teaching, contact hours	21 hours, of Integrated Course (Classroom Lecture)
Workload	Total 42Hrs/Semester (21 hours of Self Study)
Credit points	1.5 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic Mathematics- Probability & Statistics
Module objectives/intended learning outcomes	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Introduction of statistics fields of application</li> <li>2. Understand the technique of programming with R</li> <li>3. Introduction to Statistics &amp; Probability theory</li> </ol> <p><b>Learning Outcomes:</b></p> <p>Students will be able to :</p> <ol style="list-style-type: none"> <li>1. Learn the main techniques of unvaried and bivariate statistics</li> <li>2. Implement these techniques appropriately</li> <li>3. Calculate the probability of random events in daily or professional context.</li> </ol>

Content	<p><b>Chapter 1 Random experiments</b></p> <p>1.1 Random experiment, events, probabilities.  1.2 Independent events.  1.3 Conditional probability, Bayes formula.  1.4 Definition of a Markov chain.</p> <p><b>Chapter 2 Random variables</b></p> <p>2.1 Real random variables.  2.2 Law of probability.  2.3 Distribution function.  2.4 Discrete or continuous variables.  2.5 Density variables.  2.6 Usual laws: Bernoulli's law, binomial law, geometric law, Poisson law, uniform law, normal law, Cauchy law, exponential law, Chi-Square law.  2.7 Expectation, variance, moments, characteristic function.  2.8 Bienaymé-Chebyshev inequality.</p> <p><b>Chapter 3 Random vectors</b></p> <p>3.1 Independent variables.  3.2 Random vectors: marginal laws, joint law, characteristic function, expectation, covariance matrix.  3.3 Gaussian vectors.  3.4 Conditional expectation.  3.5 Conditional laws.</p> <p><b>Chapter 4 Convergence theorems for sequences of random variables</b></p> <p>4.1 Quadratic mean convergence.  4.2 Law of large numbers.  4.3 Central limit theorem.  4.4 Approximations for binomial laws.</p>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<p>[1] A. Borovkov. Mathematical statistics. Gordon and Breach Science Publishers, 1998.  [2] N. Bouleau. Probabilités de l'ingénieur. Variables aléatoires et simulation. Hermann, 1986.  [3] L. Breiman. Probability. Number 7 in Classics in Applied Mathematics. Society for Industrial and Applied Mathematics, 1992.  [4] P. Brémaud. Introduction aux probabilités. Springer Verlag, 1984.</p>



## U1.2: Materials Science Materials Science

Module designation	Materials science
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.2
Subtitle, if applicable	-
Courses, if applicable	Materials science
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Yassine FERCHICHI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce types of materials, their characteristics and applications
Type of teaching, contact hours	21 hours, of Integrated Course (Classroom Lecture)
Workload	Total 51Hrs/Semester (30 hours of Self Study)
Credit points	2 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	General Coordination Plan Document
Module objectives/intended learning outcomes	<b>Objectives:</b> <ol style="list-style-type: none"> <li>1. Understand the diversity of structures and microstructures of materials</li> <li>2. Understand the relationship between organization at the atomic scale, microstructure and properties of materials</li> </ol>

Content	<p><b>CHAPTER 1: General</b></p> <p>1.1. Introduction 1.2. Definition: What is a material? 1.3. Properties</p> <p><b>CHAPTER 2: Materials</b></p> <p>2.1. Objectives 2.2. Multiplicity and classes of materials 2.3. Material properties 2.4. Microstructure and cycle of materials 2.5. Resources and reserves</p> <p><b>CHAPTER 3: Chemical composition of materials</b></p> <p>3.1. Classification of chemical elements. 3.2. Interatomic bonds 3.3. Classification of materials and properties</p> <p><b>CHAPTER 4: Structure of Solid Materials</b></p> <p>4.1. Introduction 4.2. Definitions - Amorphous solid and crystalline solid 4.3. Arrangement of atoms in crystalline solids 4.4. Description of the crystalline state</p> <p><b>CHAPTER 5: Mechanical properties of materials</b></p> <p>5.1. General 5.2. Constraints 5.3. Conventional (or nominal) deformations 5.4. Mechanical tests 5.5. Plasticity: Plastic deformation and strain hardening 5.6. Tenacity and breakage</p> <p><b>CHAPTER 6: Physical properties of materials</b></p> <p>6.1. Thermal properties 6.2. Optical properties 6.3. Acoustic properties</p> <p><b>CHAPTER 7: Classification of materials</b></p> <p>7.1. General 7.2. Polymeric materials 7.3. Ceramics and glasses 7.4. Composite materials</p>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<p>Aide –Mémoire : Science des Matériaux</p> <p>Matériaux : Propriétés, Application et Conception</p>

## U1.2: Material Sciences Project Management

Module designation	Material Science
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.2
Subtitle, if applicable	-
Courses, if applicable	Project Management
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Nadia MEZNI
Language	French
Relation to curriculum	Transversal Subject (Soft Skills-Compulsory), To teach students project management that can be used during the curriculum and help them prepare for their professional life.
Type of teaching, contact hours	21 hours, of Integrated Course (Classroom Lecture)
Workload	Total 51Hrs/Semester (30 hours of Self Study)
Credit points	2 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic understanding of business
Module objectives/intended learning outcomes	<p><b>Course Description</b> Project management theory, terms and concepts are introduced in this course. Students will discover the project life cycle and learn how to build a successful project from pre-implementation to completion. It will introduce project management topics such as resources, costs, time constraints and project scopes.</p> <p><b>Learning Outcomes</b> Students will:</p> <ul style="list-style-type: none"> <li>▪ Be able to set time schedule, and come up with estimated cost</li> <li>▪ Be able to describe a project life cycle, and can skill fully map each stage in the cycle</li> <li>▪ Identify the resources needed for each stage, including involved stakeholders, tools and materials</li> </ul>
Content	<p>Chapter 1: The different stakeholders Chapter 2: Preparation of tender documents Chapter 3: The preparation phase Chapter 4: The Execution phase Chapter 5: Reception of the project</p>

Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<a href="https://www.cours-gratuit.com/cours-management-de-projet">https://www.cours-gratuit.com/cours-management-de-projet</a>

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## U1.2: Materials Science Thermal effect

Module designation	Materials science
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.2
Subtitle, if applicable	-
Courses, if applicable	Thermal effect
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Ismail YOUSFI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce thermal transfer theory, and applications
Type of teaching, contact hours	42 hours, of Integrated Course (Classroom Lecture)
Workload	Total 84Hrs/Semester (42 hours of Self Study)
Credit points	3 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic knowledge of thermodynamics
Module objectives/intended learning outcomes	<p><b>Outcomes:</b> The student is expected to:</p> <ul style="list-style-type: none"> <li>- Acquire the difference between types of heat transfer (Conduction, convection, Radiation)</li> <li>- Identify thermal resistance due to the passage of a thermal flow</li> <li>- Evaluate the thermal efficiency of a given structure (of a building, cylindrical pipe, spherical tank)</li> <li>- Understand different cooling solutions</li> </ul>

Content	<p><b>Chapter 1. Conduction</b></p> <p>1.1. Fourier's law</p> <p>1.2. Conduction in a single-layer and composite wall</p> <p>1.3. Conduction in one-layer and multi-layer hollow cylinder</p> <p>1.4. Conduction in a single-layer and multi-layer hollow sphere</p> <p><b>Chapter 2. Convection</b></p> <p>1.1. Newton's Law</p> <p>1.2. Convection in a single-layer and composite wall</p> <p>1.3. Convection in a single-layer and multi-layer hollow cylinder</p> <p>1.4. Convection in a single-layer and multi-layer hollow sphere</p> <p><b>Chapter 3. Laplace equation</b></p> <p>1.1. Laplace equation for a wall.</p> <p>1.2. Laplace equation for a hollow cylinder.</p> <p>1.3. Laplace equation for a hollow sphere.</p> <p><b>Chapter 4. Radiation</b></p> <p><b>Chapter 5. Study of the fins</b></p> <p><b>Chapter 6. Notions on tubular exchangers and Thermal machines</b></p>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<p>[1] Jean- Luc Battaglia et al.(20 14) “Introduction aux transferts thermiques”</p> <p>[2] André Giovannini, Benoît Bédard (2012) , “Transfert de chaleur”</p> <p>[3] José Ouin (1998) “Transferts thermiques”</p> <p>[4] Nicole Cortial (2015) “Transferts thermiques, acoustique, photométrie”</p>

### U1.3: Mechanics 1 Solid Mechanics

Module designation	Mechanics 1
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.3
Subtitle, if applicable	-
Courses, if applicable	Solid mechanics
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Mahez BOUAZIZI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce principle of solid mechanics, theory and applications
Type of teaching, contact hours	21 hours, of Integrated Course (Classroom Lecture)
Workload	Total 42Hrs/Semester (21 hours of Self Study)
Credit points	1.5 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Mechanics, Mathematics
Module objectives/intended learning outcomes	<p><b>The objectives</b> of this course are:</p> <ol style="list-style-type: none"> <li>1. To understand the mechanism operation, laws and principles of solid mechanics,</li> <li>2. Understand :movement - trajectory, etc. ;</li> <li>3. Understand uniform translational movement; uniform circular motion; strengths ;</li> <li>4. To solve advanced solid mechanics problems using classical methods</li> <li>5. To apply commercial software on select, applied solid mechanics problems</li> </ol> <p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Understanding of the concepts of stress and strain.</li> <li>2. Determination of internal forces and deflections in the beam.</li> <li>3. Understanding the various methods of analysis of beams, trusses and effect of torsion.</li> <li>4. Application of the principles and basic of Solids Mechanics in the civil engineering structures.</li> </ol>

Content	<p><b>Chapter I - Basics:</b></p> <ol style="list-style-type: none"> <li>1. Bipoint and vector (free, linked, sliding, vector operations)</li> <li>2. Scalar product and guiding cosines of a line</li> <li>3. Cross product (Gibbs formula, ...)</li> <li>4. Mixed product</li> <li>5. Moment of a slider (with respect to a point, with respect to an axis)</li> <li>6. Vector division</li> <li>7. The torsors (definition, invariants, central point, central axis, co- moment, auto-moment)</li> <li>8. Particular twists</li> </ol> <p><b>Chapter II - Kinematics of the material point:</b></p> <ol style="list-style-type: none"> <li>1. The vector derivation (definition, properties, change of the derivation coordinate system)</li> <li>2. The rotation vector</li> <li>3. Properties of the rotation vector (composition, inversion of the derivation bases)</li> <li>4. Position of a point in a landmark</li> <li>5. Speed, hodograph</li> <li>6. Acceleration of a point with respect to a coordinate system (geometric interpretation)</li> </ol> <p><b>Chapter III- Kinematics of the indeformable solid:</b></p> <ol style="list-style-type: none"> <li>1. Kinematics of the mechanisms definition, degrees of freedom,</li> <li>2. Relative position of two solids)</li> <li>3. Point linked to a solid</li> <li>4. Fields of vectors acceleration of points of a solid</li> <li>5. Composition of movements</li> <li>6. Torsor sliding speed at a point between two solids (definition, relative movement)</li> <li>7. Plane on plane movement</li> </ol>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<p>[1] Mécanique du solide (applications industrielles) : par Pierre Agati, Yves Bremond &amp; Gérard Delville, 2ème édition, Dunod, '96</p> <p>[2] Mécanique générale et analytique : par Emmanuel Plaut , 3ème Année de l'ENSEM Cinématique générale : par Jean-Pierre BROSSARD, Techniques de l'Ingénieur A 1 661</p>



### U1.3: Mechanics 1 Construction General Process

Module designation	Mechanics 1
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.3
Subtitle, if applicable	CGP
Courses, if applicable	Construction General Process
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Dr Issam Khezami
Language	French
Relation to curriculum	Professional module (compulsory), To introduce all aspect of large scale buildings planning, design and construction.
Type of teaching, contact hours	42 hours, of Integrated Course (Classroom Lecture)
Workload	Total 84Hrs/Semester (42 hours of Self Study)
Credit points	3 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Construction Materials
Module objectives/intended learning outcomes	<p><b>Course Objectives:</b></p> <p>-To introduce to students the planning and design of large-scale buildings with high degree of complexity by understanding architectural, socio-cultural, and economic issues connected with architecture.</p> <p>-Complete approach to design encompassing site planning, building design, environment and services.</p> <p><b>Course Outcome :</b></p> <p>At the end of the course, the students shall have acquired knowledge of the process involved in addressing a design problem with emphasis on site planning.</p>

Content	<p><b>Chapter I: Presentation of Civil Engineering Works</b></p> <ol style="list-style-type: none"> <li>1. The shell</li> <li>2. The second work</li> <li>3. The various stakeholders</li> <li>4. The different types of civil engineering works</li> </ol> <p><b>Chapter II: General information on earthworks</b></p> <ol style="list-style-type: none"> <li>1. Earthworks preparation</li> <li>2. Terminology of general earthworks</li> <li>3. Different types of excavations</li> <li>4. Nature of the land</li> <li>5. Soil condition after extraction</li> <li>6. Determination of truck cycles</li> </ol> <p><b>Chapter III: Earthworks in soft ground</b></p> <ol style="list-style-type: none"> <li>1. Technical documents</li> <li>2. Location</li> <li>3. Manual earthworks</li> <li>4. Mechanical earthworks</li> <li>5. Completion of the work</li> <li>6. Control</li> </ol> <p><b>Chapter IV: Shielding of excavations and water drawdown</b></p> <ol style="list-style-type: none"> <li>1. Types of shielding</li> <li>2. Shielding techniques</li> <li>3. Berlin walls (retaining walls) and diaphragm walls</li> <li>4. Recoverable armor and lost armor</li> <li>5. Control</li> </ol> <p><b>Chapter V: Deep and shallow foundations</b></p> <ol style="list-style-type: none"> <li>1. Principle and functions</li> <li>2. Types of foundations</li> <li>3. Methodology and means of carrying out the work</li> <li>4. Quality control</li> </ol>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	<p>-Course Material (Hard/ Soft copy) for Classroom &amp; Online (Moodle ULT)</p> <p>-Study Tour for Construction Project Sites and on site demo</p>
Reading list	<ol style="list-style-type: none"> <li>1. Procédés généraux de construction Tome 1 : Coffrage et bétonnage, J. MATHIVAT et C. BOITEAU. ENPC, Eyrolles</li> <li>2. Procédés généraux de construction Tome 2 : Fondation et ouvrages d'art, J. MATHIVAT et FENOUX. ENPC, Eyrolles</li> </ol>

### U1.3: Mechanics 1 Fluid Mechanics

Module designation	Mechanics 1
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.3
Subtitle, if applicable	-
Courses, if applicable	Fluid Mechanics
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Ismail YOUSFI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce fluid mechanics theory, energy transfer and their applications
Type of teaching, contact hours	42 hours, of Integrated Course (Classroom Lecture)
Workload	Total 84Hrs/Semester (42 hours of Self Study)
Credit points	3 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic fluid mechanics- preparatory cycle
Module objectives/intended learning outcomes	<p><b>Learning Outcomes:</b> Students will be able to :</p> <ol style="list-style-type: none"> <li>1. Understand the underlying physical phenomena translated into the equation of mechanics of real fluids,</li> <li>2. Acquire fundamental concepts and apply them to the study of industrial processes involving phenomena of transformation or transfer of energy</li> </ol>

Content	<p><b>Chapter 1 Introduction:</b>  1.1 Properties,  1.2 Pressure,  1.3 Units</p> <p><b>Chapter 2 General equations and general theorems of fluid mechanics:</b>  2.1 Nature of the fluids studied (perfect incompressible fluids, viscous incompressible fluid, perfect Barotropic fluid)  2.2 Fluid statics  -Statics of compressible fluids  -Statics of incompressible fluids,  -Archimedes theory  2.3 General equations of fluid dynamics:  -Perfect fluids,  -Incompressible viscous fluids  2.4 General theorems of fluid mechanics  -Applications of the momentum theorem,  -Results relating to the energy of a fluid,  -Theorems relating to the rotation of the fluid</p> <p><b>Chapter 3 Irrotational and stationary plane flows of an incompressible perfect fluid</b></p> <p><b>Chapter 4 Irrotational flows of a perfect fluid</b></p> <p><b>Chapter 5 Linear flows of perfect fluids</b></p> <p><b>Chapter 6 Incompressible and viscous fluid flows</b></p>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	-Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<ol style="list-style-type: none"> <li>1. Mécanique de fluides – Prépas PC-PSI Céline Anthoine – Guillaume Levèvre – Samuel Marque- 1999</li> <li>2. Mécanique des fluides incompressibles Mohamed MAALEJ Centre de Publication Universitaire (CPU) 2001</li> </ol>

## U1.4: Computer & Technologies Measurement & Instruments

Module designation	Computer & Technologies
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.4
Subtitle, if applicable	-
Courses, if applicable	Measurement & Instruments
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Ilyes MAZHOUD
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce measurement science, types, and instruments
Type of teaching, contact hours	21 hours, of Integrated Course (Classroom Lecture)
Workload	Total 42Hrs/Semester (21 hours of Self Study)
Credit points	1.5 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic knowledge in measurement units
Module objectives/intended learning outcomes	<p><b>Course Objectives:</b></p> <ol style="list-style-type: none"> <li>1. To understand the basic principles, construction and working of engineering measurement science.</li> <li>2. To acquire proficiency in using, calibrating various measurement systems.</li> <li>3. To understand the problems in measurement system and develop the competency to resolve the problems.</li> <li>4. To know all the measuring instruments and to measure different parameters in day-today work.</li> <li>5. To acquire the principles of sensors and actuators and their role in current measurement systems and industrial equipment.</li> </ol> <p><b>Course Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Students will be able to understand the stepwise working of all instruments.</li> <li>2. Students will be able to know the importance of all factors affecting on output of instruments <i>i.e. errors</i>.</li> <li>3. Students will be able to differentiate between all types of measurements <i>i.e. Direct &amp; indirect type contact &amp; non-contact type</i>.</li> <li>4. Be aware of tolerance through the concepts of metrology.</li> </ol>

Content	<p><b>Chapter 1 Introduction:</b>  1.1 Role of instrumentation and measurement in science, industry and other areas of life  1.2 Evaluation of instrumentation and measurement techniques, news.</p> <p><b>Chapter 2 Metrology:</b>  2.1 Basics, problems in measurement  2.2 Metrological characteristics  2.3 Measurement converter</p> <p><b>Chapter 3 Techniques for measuring physical quantities and processing</b></p> <p><b>Chapter 4 Analog and digital measuring instruments</b>  4.1 Classification  4.2 Principle of operation  4.3 Use of the main measuring instruments (multi-meters, oscilloscopes, etc.)</p> <p><b>Chapter 5 Sensors:</b>  5.1 Industrial role of sensors  5.2 Conditioning and processing of signals from sensors  5.3 Main types of sensors (thermal, optical, flow, speed, pressure)  5.4 From raw sensor to intelligent equipment  Use: in medicine, in industry (robot, automobile, etc.)</p>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<p>[1] G. ASCH et coll. (1998). LES CAPTEURS EN INSTRUMENTATION INDUSTRIELLE. (DUNOD, Collection EEA, Paris), 864 pages, 5ème édition. ISBN : 2100047582</p> <p>[2] Chiheb BOUDEN, Textbook for Instrumentation Lectures, ENIT, 1996 L. BERGOUGNOUX, Conditionnement Electronique des Capteurs, Polytechnique Marseille.</p>

## U1.4: Computer & Technologies

### Computer Aided Drawing CAD 1

Module designation	Computer & Technologies
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.4
Subtitle, if applicable	-
Courses, if applicable	Computer Aided Drawing CAD 1
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Ramadhane Riguen
Language	French
Relation to curriculum	Professional module (compulsory), To introduce CAD Tools to students, and their applications
Type of teaching, contact hours	42 hours, of Practical Workshop
Workload	Total 56Hrs/Semester (14 hours of Self Study)
Credit points	2 credits
Requirements according to the examination regulations	Final Practical exam at the end of semester without elimination Use of Software User Manual is Authorized
Recommended prerequisites	Basic Drawing
Module objectives/intended learning outcomes	<b>Learning Outcome(s):</b> Students will be able to: 1. Create detailed technical drawings of buildings, structures, and various construction projects. 2. Demonstrate aptitude at using a variety of civil engineering CAD software.
Content	1. Description of the methods and techniques of graphic representations in civil engineering (sketch, working drawing); 2. Digital drawing (vector image, bitmap image); 3. Graphic interface of drawing software; 4. Types and formats of graphic media (paper space, workspace ); 5. Handling of ladders; Graphic components (definition of layers, colors, etc.); 6. Basic commands for drawing using the computer (line, circle, rotation, symmetry, etc.); 7. Mastery of layout, lettering and quotes; Orthogonal projection.
Study and examination requirements and forms of examination	-Report for each project, exercise to be submitted and evaluated. -Final assessment at the end of the semester
Media employed	Video Projector, Demo & Tutorials in Computer Lab
Reading list	AUTODESK Guidebook & Tutorials for AUTOCAD

## U1.5: Languages & Soft Skills

### English I

Module designation	Languages & Soft Skills
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.5
Subtitle, if applicable	-
Courses, if applicable	English I
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Nadia ZARDI
Language	English
Relation to curriculum	Transversal Subject (Soft Skills-Compulsory), To teach students English as Foreign Language and help them prepare for their professional life.
Type of teaching, contact hours	21 hours, of Integrated Course (Classroom Lecture)
Workload	Total 42Hrs/Semester (21 hours of Self Study)
Credit points	1.5 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic English Grammar, Vocabulary, & Structures
Module objectives/intended learning outcomes	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. This module seeks to develop the students' abilities in grammar, oral skills, reading, writing and study skills</li> <li>2. Learn to reuse structures and vocabulary in new contexts.</li> <li>3. Focus mainly in reading and writing.</li> <li>4. Grammar exercises will be presented to address students' difficulties with various structural aspects of the English language.</li> </ol> <p><b>Learning Outcomes:</b></p> <p>Students will be able to :</p> <ol style="list-style-type: none"> <li>1. Improve comprehension of scientific texts</li> <li>2. Enhance their conversational skills in professional contexts</li> <li>3. Develop Business English skills by writing e-mails, memos and business letters, participating in simulated meetings and role-plays, and discussing case studies.</li> </ol>



Content	<p><b>Chapter 1. Meetings</b></p> <ol style="list-style-type: none"> <li>1. Chairing, setting the agenda, controlling the conversation</li> <li>2. Participating, turn taking, listening and taking notes</li> <li>3. Being diplomatic, agreeing and disagreeing</li> </ol> <p><b>Chapter 2. Business Correspondence</b></p> <ol style="list-style-type: none"> <li>1. Emails– register, style, standard phrasing</li> <li>2. Notes and memos</li> <li>3. Business specific language phrases</li> </ol> <p><b>Chapter 3. Telephoning</b></p> <ol style="list-style-type: none"> <li>1. Checking &amp; clarifying information</li> <li>2. Finance-specific scenarios</li> <li>3. Listening to different accents, intonation</li> </ol> <p><b>Chapter 4. Making Presentations</b></p> <ol style="list-style-type: none"> <li>1. Introducing a topic effectively</li> <li>2. Linking and sequencing ideas</li> <li>3. Concluding</li> <li>4. Responding to questions</li> </ol> <p>The content is supported by systematic work on core grammatical structures, vocabulary patterns and pronunciation.</p>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	This course does not require a textbook. Instead, the Teacher has provided reading materials and videos for each module to the student.

## U1.5: Languages & Soft Skills Communication Techniques

Module designation	Languages & Soft Skills
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.5
Subtitle, if applicable	-
Courses, if applicable	Communication Techniques
Semester (s) in which the module is taught	Semester 1 (S1)
Person responsible for the module	Dr Issam Khezami
Lecturer	Lamia KHARRAT
Language	French
Relation to curriculum	Transversal Subject (Soft Skills-Compulsory), To teach students communication techniques that can be used during the curriculum and help them prepare for their professional life.
Type of teaching, contact hours	21 hours, of Integrated Course (Classroom Lecture)
Workload	Total 42Hrs/Semester (21 hours of Self Study)
Credit points	1.5 credits
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	French Language skills
Module objectives/intended learning outcomes	<p><b>Objectives:</b></p> <ol style="list-style-type: none"> <li>1. Give the student the essential tools that will allow him to fully master the mechanisms of technical expression (writing letters, reports, etc.)</li> <li>2. Make students aware of the importance of communication as a promotional tool in their future professional activity.</li> </ol> <p><b>Learning Outcomes:</b></p> <ol style="list-style-type: none"> <li>1. Students will be able to understand and apply knowledge of human communication and language processes as they occur across various contexts, e.g., inter &amp; intrapersonal, small group, organizational, technologically mediated communication, etc. from multiple perspectives.</li> <li>2. Students will be able to find, use, and evaluate primary academic writing associated with the communication discipline.</li> </ol>

Content	<ol style="list-style-type: none"> <li>1. Argumentation: The different types of arguments.</li> <li>2. The feedback. Ex: <i>The Meeting Report</i>.</li> <li>3. The verbal procedure.</li> <li>4. The report. Ex: <i>the Internship Report</i>.</li> <li>5. Administrative correspondence:</li> <li>6. The official letter</li> <li>7. The Resume</li> <li>8. The Cover letter</li> <li>9. The memo and the circular</li> <li>10. The vocabulary of meetings.</li> <li>11. The techniques of the oral presentation.</li> <li>12. The job interview.</li> </ol>
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (40%) + Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT)
Reading list	<ol style="list-style-type: none"> <li>1. BIACONI André, <i>Les techniques de l'expression écrite et orale, la pratique actuelle de la rédaction et de la communication écrite dans la vie professionnelle et les relations sociales</i>, 1978.</li> <li>2. BARBOTTIN Gérard, <i>Rédiger des textes techniques et scientifiques en français et en anglais</i>. INSEP Consulting Éditions, Paris, 2002.</li> <li>3. BARIL Denis, GUILLET Jean, <i>Les techniques de l'expression écrite et orale</i> ; Éditions Sirey, Paris</li> </ol>

## U1.6: Projects

Module designation	Projects
Module level, if applicable	1 <sup>st</sup> year
Code, if applicable	U1.6
Subtitle, if applicable	-
Courses, if applicable	Mini Project
Semester (s) in which the module is taught	Annual
Person responsible for the module	Dr Issam Khezami
Lecturer	Nessrine GABSI
Language	French
Relation to curriculum	Professional module
Type of teaching, contact hours	21 H of Project Supervision in Campus during the semester
Workload	Total 51 Hrs/Semester (30hours of Self Study)
Credit points	2 credits
Requirements according to the examination regulations	Defence session of the project -Appreciation given by the Jury
Recommended prerequisites	Computer Aided Drawing CAD 1 General Coordination Plan GCP
Module objectives/intended learning outcomes	This is an exercise that will help student to apply knowledge's & Skills to present a basic project.
Content	The project will be proposed by the teacher and validated at the end of the semester by the Jury. The scoop & axes are: - Initiation to civil engineering - Bibliographic research on the basic elements of the project - Do an architectural reading - Discuss the choice of the design to be planned - Learn about the Roads and Miscellaneous Network RMN part - Estimate the cost of the project
Study and examination requirements and forms of examination	Projects - 100% (Evaluation of the final report of project)
Media employed	Video projector, Remote supervision (email, video conferences)
Reading list	References are given depending on the project specifications.