ULT Civil Engineering

Subjects Modules for S3

Semester 1 Year 2

U3.1 : Mechanics 3
Soil Mechanics 1

Module designation	Mechanics 3
Module level, if applicable	2nd year
Code, if applicable	U3.1
Subtitle, if applicable	
Courses, if applicable	Soil Mechanics 1
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Hatem KAROUI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce Soils Mechanics theory, and applications to students.
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	Materials science, Solid Mechanics
Module objectives/intended learning outcomes	**Objectives:** 1. Mastery of the geotechnical study of soils for the construction of various civil engineering structures 2. To develop an understanding of the relationships between physical characteristics and mechanical properties of soils; **Learning Outcomes:** Students will be able to: 1. Gain a basic understanding of fundamentals of soil behavior and soil classification systems. Materials science, Solid Mechanics

Content	**Chapter I: Soils: Physical properties and identification** 1- Definition of soils - soil constituent elements 2- Physical characteristics of soils 3- Dimensional characteristics 4- Soil structure 5- Identification tests - grainy soils 6- Identification tests - fine soils 7- Other tests 8- Soil classification **Chapter II: Deformation of soils** 1-Stresses in soils 2-Calculation of stresses due to overloads 3-Soil compressibility 4-Calculation of settlement - layer method 5-Terzaghi & Fröhlich Consolidation Theory 6-Duration of settlements 7-Secondary consolidation 8-Constructive provisions - admissible settlements **Chapter III: Soil hydraulics** 1-Underground hydraulic elements 2-Hydraulic three-dimensional flows from wells 3-Two-dimensional flows flow networks 4-Mechanical effects of water on soils fluid-skeleton interaction 5-Effects of capillarity in soils **Chapter IV: Shear resistance of soils** 1-Elementary notions on soil failure 2-Mohr-Coulomb circle and consequences 3-Laboratory measurement of fracture characteristics
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	1- G. Sanglérat, G. Olivera et B. Combou « Cours de mécanique des sols et de fondations » 2- F . Schlosser " Eléments de mécanique des sols » 3- F . Schlosser " Exercices de mécanique des sols » 4- G. Philipponnat « Fondations et ouvrages en terre » 5- Robert W. Day « Foundation Enginnering Handbook »

U3.1 : Mechanics 3
Diagnosis & Rehabilitation of Buildings

Module designation	Mechanics 3
Module level, if applicable	2nd year
Code, if applicable	U3.1
Subtitle, if applicable	
Courses, if applicable	Diagnosis & Rehabilitation of Buildings
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Dr Issam Khezami
Language	French
Relation to curriculum	Professional module (compulsory), To introduce Diagnosis & Rehabilitation of Buildings methods and applications to students.
Type of teaching, contact hours	15hours, of Integrated Course (Classroom Lecture) 6 hours for Project
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	Concrete Technique, Resistance Of Material ROM
Module objectives/intended learning outcomes	**Course objectives :** 1. The student will be able to acquire the necessary knowledge to establish any pathological study, reinforcement or repair of a building structure. 2. To study the various types and properties of repair materials 3. To learn various repair techniques of damaged structures, corroded structures **Course outcomes** : Students will be able to: 1. Understand various distress and damages to concrete and building structures 2. Work on maintenance of structures projects and identify types and properties of repair materials. 3. To assess damage to structures and propose various repair solutions.

Content	**Chapter 1. Different degrees of rehabilitation** **Chapter 2. Diagnosis and Investigation techniques** **Chapter 3. Pathology of the structures.** **Chapter 4. Mechanisms of degradation.** **Chapter 5. Methods of rehabilitation of building structures.** **Chapter 6. Soil improvement techniques** **Chapter 7. Soil compaction** **Chapter 8. Nailing of floors** **Chapter 9. Non-destructive auscultation devices (NDT)**
Study and examination requirements and forms of examination	Format: Written Mid-term Exam (25%) + Project Evaluation (25%)+Final Exam (50%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) On site visits to building renovation projects.
Reading list	http://openarchive.icomos.org/1398/1/Methode%20Rehabimed.%20Rehabilitation%20Batiments.pdf

U3.1 : Mechanics 3
Theory of structure 1

Module designation	**Mechanics 3**
Module level, if applicable	2nd year
Code, if applicable	U3.1
Subtitle, if applicable	****
Courses, if applicable	Theory of structure 1
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Mansour EL JEMLI
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce Structure theory, and applications to students.
Type of teaching, contact hours	42 hours, of Integrated Course (Classroom Lecture) 21 hours practical workshop in Lab
Workload	Total 84 Hrs/Semester (21 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	Resistance Of Material, Continuum Mechanics
Module objectives/intended learning outcomes	**Course Objectives:** 1. Give the students fundamental understanding of principle and methods used for the analysis of statically indeterminate structures. 2. To expose the students to different study cases through practical workshops. **Learning Outcomes** Student will be able to: 1. Apply principles of Resistance Of Material, Mechanics and use appropriate tools to solve problems in Civil Engineering Structures. 2. Design and evaluate structural components and systems to meet the specification.

Content	**Classroom Lecture :** **Chapter 1: Calculation of displacements in isostatic structures** 1. Calculation of deformations by the integration method 2. Calculation of deformations by the energy method 3. Calculation of deformations by Navier-Bresse methods 4. Calculation of deformations by Mohr table (TTV) **Chapter 2: Hyperstatic Span Internal forces** 1. Definition 2. Degree of hyperstaticity **Chapter 3: Hyperstatic Systems Resolution by force method** 1. Introduction: principle of the force method 2. Equivalent isostatic structures 3. Principle of superposition 4. Principle of proportionality 5. Principle of compatibility of deformations 6. Determination of the strains δij **Practical Workshop in Laboratory** **TP1- Study of a beam subjected to simple bending** **Objective:** To determine the normal stresses for each fiber and to verify experimentally that the neutral fiber and the average fiber are the same. **TP2- Study of the trellis** **Objective:** To determine the internal forces in the bars and the support reactions. **TP3- Study of the buckling of a bar** **Objective:** To determine the critical Euler load of a bar with different boundary conditions. **TP4- Study of a bar subjected to torsion** **Objective:** To find the relationship between the moment of torsion and the deformation of a bar. Determine the shear modulus for each material. **TP5- Study of an arch with two joints** **Objective:** To compare the experimental horizontal reaction to the theoretical reaction according to the nature of the load (point or uniformly distributed).
Study and examination requirements and forms of examination	Written Mid-term Exam (25%) + Practical work (25%) +Written Final Exam (50%)
Media employed	Course Material (Hard⁄ Soft copy) for Classroom & Online (Moodle ULT) Practical workshop in Lab
Reading list	Aide-mémoire RDM Ed Dunod ; Alexandru D.C. Quelques chapitres de la résistance des matériaux. Ed. OPU, Alger, 267p Timoshenko S. Résistance des matériaux – Tome 1: Théorie élémentaire et problèmes. 3 ème Ed. Dunod, Paris, 1968, 420p. Timoshenko S. Résistance des matériaux – Tome 2: Théorie développée et problèmes, Dunod, Paris, 1968. 3ème Ed. Dunod, Paris, 1968, 464p.

U3.2 : Building Technique
Urbanism

Module designation	**Building Technique**
Module level, if applicable	2nd year
Code, if applicable	U3.2
Subtitle, if applicable	****
Courses, if applicable	Urbanism
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Souhir BOUZID
Language	French
Relation to curriculum	Professional module (compulsory), To introduce all aspects in Urban City, and their description to students.
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	Architecture Drawing
Module objectives/intended learning outcomes	**Course Objectives:** 1. To know the basics of architecture and urban planning. 2. Understand the relationship between the architectural object and the city. 3. To develop skills in preparing land use plan for selected urban area. **Outcomes:** Student will be able to: 1. Identify the regulations and procedures of formulating local land-use plans, zoning and their impact on the investment. 2. Demonstrate knowledge of parameters of traffic and the principles of designing roads, streets, and parking lots.

Content	**Part A Basics of Architecture:** Chapter 1. Definitions and history, Chapter 2. Design of the architectural project 1. Site and situation, 2. Functional program, 3. Human scale, 4. Building aesthetics, 5. Climatic data, Chapter 3. Implementation of the architectural project 1. Construction materials and techniques, 2. Special lots: electricity, water & sanitation, carpentry **Part B Basics in urban planning:** Chapter 1. Definitions and history of urban planning, Chapter 2. Urban fabrics, housing 1. Individual, 2. Collective 3. Other Chapter 3. Roads and various networks 1. Drinking water, 2. Sanitation, 3. Public lighting 4. Other Chapter 4. Socio-collective facilities, urban activities: 1. Trade, 2. Services, 3. Crafts 4. Others Chapter 5. Vital Sectors development 1. Tourism, 2. Industrial 3. Other Chapter 6. Urban planning tools and regulatory framework.
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) -Video projection
Reading list	Guide : Aménagement et projet urbain Institut d'Aménagement et d'Urbanisme de la région d'Ile-de-France https://www.iau-idf.fr

U3.2 : Building Technique
Building Information Modeling BIM 2

Module designation	**Building Technique**
Module level, if applicable	2nd year
Code, if applicable	U3.2
Subtitle, if applicable	****
Courses, if applicable	Building Information Modeling BIM 2
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Ramadhane RIGUEN
Language	French
Relation to curriculum	Professional Subject (Compulsory) Continue to study BIM concept and modelling techniques with application using computer Tools
Type of teaching, contact hours	21 hours, of practical workshop in Lab
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	CAD 1, CAD 2, BIM 1 , Concrete , Resistance Of Material ROM
Module objectives/intended learning outcomes	**Objectives:** 1. Achieve relevant graphic production 2. Understand the process of implementing BIM and how BIM-based designs for Structural, Mechanical, Electrical, Plumbing, Communications, Security, Fire Protection fit into the overall Construction Document. **Learning Outcomes:** Student will be able to: 1. Design Architectural and Structures Models for a project, component, or process to meet desired needs or specifications, and provide deliverables. 2. Identify, formulate and solve engineering problems through the use of BIM technology,

Content	**Chapter 1: Architectural Modeling** Creation of a building - Creation of levels and grids - Installation of elevations Design of an architectural model based on a project template - Wall, floors, roof - Window, door, opening **Chapter 2: Modeling Of Structure** Creation of foundation model - Add foundations and inclined beams - Create foundation slabs and slabs on the ground Adding columns and walls to the structure - Addition of structural posts - Addition of posts on a straight and arched grid line - Addition of concrete posts - Addition of beams Adding foundations to a structure - Creation of a foundation plan - Creation of a foundation wall - Addition of isolated post - Addition of Running Soles - Addition of a raft Adding concrete reinforcement to a structure - Reinforcement cover parameters - Insulate a concrete slab - Addition of a surface reinforcement (Trellis) - Modification of reinforcement visibility - Addition of a surface reinforcement (surface trellis) - Modification of a rebar - Addition of a reinforcing bar in networks - Make a reinforcement in networks **Chapter 3: Application Of Coordination According To The BIM Methodology -Initiation-** Start a project using an AutoCAD underlay - Link an AutoCAD file - Pin the project in place - Adjustment of display tint - Control AutoCAD objects - Adding Revit files - Added information from an AutoCAD file to a Revit file Creating and Controlling Viewpoints in Revit - Creation of a section view - Creation of a plan view - Added wall section of walls - Creation of a Legend view
Study and examination requirements and forms of examination	-Practical exam (100%) -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 Guides and Tutorials for Revit Tools

U3.2 : Building Technique
Building Physics

Module designation	**Building Technique**
Module level, if applicable	2nd year
Code, if applicable	U3.2
Subtitle, if applicable	****
Courses, if applicable	Building Physics
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Mehdi BASSEM
Language	French
Relation to curriculum	Scientific Subject (compulsory), To introduce Building Physics, and all factors that affect buildings to students.
Type of teaching, contact hours	21 hours, of Integrated Course (Classroom Lecture)
Workload	Total 51 Hrs/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	Fluid Mechanics, Thermal Transfer

Module objectives/intended learning outcomes	**Objectives:** The students are expected to acquire: 1. Basic concepts in thermal and acoustics of buildings; 2. Existing calculation techniques, in particular those set out in technical and foreign regulations in the field; 3. Knowledge of the construction systems used in thermal and sound insulation of buildings 4. Knowledge of heating and air conditioning equipment. **Outcomes:** Students are expected to be able to: 1. Implement sustainable, passive solar design and energy efficient principles in building design for new buildings and for building renovation; 2. Undertake a comparative study of possible solutions for improving the energy performance of an existing building including an investment analysis study; 3. Refer the principles of natural ventilation for residential buildings; 4. Recognize the most usual acoustic renovation solutions for sound absorption in rooms, airborne and impact sound insulation in buildings.
Content	**Chapter 1. Heat Transfers** 1. Conduction 2. Convection 3. Radiation **Chapter 2. Regulatory Technical Documents** 1. Calculation of losses 2. Calculation of calorific inputs **Chapter 3. Thermal Insulation Processes** 1. Insulation from the inside 2. Insulation from the outside 3. Distributed insulation **Chapter 4. Building Equipment** 1. Heating equipment 2. Air conditioning equipment **Chapter 5. Building Acoustics** 1. Basics 2. Acoustic insulation processes
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) Video projection and case study
Reading list	*Documents Techniques Réglementaires DTR C 3-2 et C 3-4 ; Manuels Carrier ; Documents* *Techniques Unifiés ; ASHRAE Handbook ; Sciences du Bâtiment P. Chemillier*

U3.3 : Public Works 1
Economic Evaluation of Constructions

Module designation	**Public Works 1**
Module level, if applicable	2nd year
Code, if applicable	U3.3
Subtitle, if applicable	****
Courses, if applicable	Economic Evaluation of Constructions
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Nadia MEZNI
Language	French
Relation to curriculum	Professional module (compulsory), To introduce all aspects in Economic Evaluation of Constructions and their description to students.
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 GPC, Concrete and materials technologies, Reinforced concrete
Module objectives/intended learning outcomes General Coordination Plan GPC, Concrete and materials technologies, Reinforced concrete	**Objectives :** 1. This course aims to calculate the costs of civil engineering projects as well as the cost estimate bill. 2. To develop in the student the skill of measuring the monetary value and the volume of work. 3. To demonstrate through calculation examples how work time and cost factors affect the global construction work cost. **Outcomes :** Student will be able to : 1. Prepare a format for preparation and presentation of an estimate cost bill. 2. Identify the main sources of labour rates, equipment & other costs 3. List the factors that contribute to the estimation of overhead costs and conduct simulation cases.

Content	1) Research of elementary quantities of components (2) Calculation of hourly labor disbursements (3) Calculation of the pre-tax costs of materials delivered to site (4) Calculation of the costs of using production equipment assignable to each Work Activity (WA) . (5) Calculation of price sub-details in Flat Cost (FS) (6) Finding the P.V.H.T / FS (K) sales coefficient and calculating the P.V.H.T for each WA (7) Preparation of the Cost Estimate Bill (CEB) **Sales price without taxes SPWT** **Flat Cost FS** **Work Activity WA** **Cost Estimate Bill CEB**
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	https://www.letsbuild.com/fr/blog/processus-de-gestion-de-projet-de-construction

U3.3 : Public Works 1

Worksite Organization

Module designation	**Public Works 1**
Module level, if applicable	2nd year
Code, if applicable	U3.3
Subtitle, if applicable	
Courses, if applicable	Worksite Organization
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Hajer BEN AMOR
Language	French
Relation to curriculum	Professional module (compulsory), To introduce all aspects in Worksite Organization, planning, and description to students.
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 GCP, Construction materials, Concrete
Module objectives/intended learning outcomes	**Objectives:** 1. Learn about project management. 2. Apply estimation and planning techniques to a construction project (road, structure, etc.). 3. Students go through project contract example to understand rights, duties, responsibilities, claims management and assignment of risk. **Outcomes:** Students will be able to: 1. Understand staffing requirements and the roles of those individuals required to operate and manage various types of construction project sites 2. Be aware of Safety Issues of construction projects sites.

Content	**Chapter 1. Site preparation** **Chapter 2. Line production programming on site** **Chapter 3. Site installation plan** **Chapter 4. Quality assurance plan** **Chapter 5. Health and safety plan** **Chapter 6. Site budget** **Chapter 7. Monitoring and planning of works, labor, materials and equipment**
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) Video projection
Reading list	Livres et polycopies, sites Internet, etc.

U3.3 : Public Works 1

Roads Engineering 1

Module designation	**Public Works 1**
Module level, if applicable	2nd year
Code, if applicable	U3.3
Subtitle, if applicable	****
Courses, if applicable	Roads Engineering 1
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Dr Issam Khezami
Language	French
Relation to curriculum	Professional module (compulsory), To introduce all aspects Road engineering, projects description and planning to students.
Type of teaching, contact hours	42 hours, of Integrated Course (Classroom Lecture)
Workload	Total 42Hrs/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	Topography, CAD
Module objectives/intended learning outcomes	**Objectives:** 1. Understand the geometric design standards and pavement adopted for roads. 2. Understand concept of network planning, road alignment, surveys and factors for route selection. 3. Construction specifications, equipment required for different operations. **Outcomes:** Students will be able to: 1. Read and understand road project construction technical specifications, 2. Identify resources, materials, and equipment required for different projects steps. 3. Do necessary site surveys, measurement, and resolving related issues.

Content	**CHAPTER 1: GENERAL** 1. Road use 2. Road users 3. Road network **CHAPTER 2: BASIC ELEMENTS OF A ROAD PROJECT** 1. Characteristics and types of vehicles 2. Criteria for choosing basic data 3. Fundamental parameters of road projects 4. Basic elements of a road project **CHAPTER 3: PLOTTING** 1. Definition 2. Trace search 3. Calculation of the radius in plan 4. Calculation of the length of a plan layout 5. Progressive curvature connections **CHAPTER 4: LONG PROFILE** 1. Geometry of the longitudinal profile 2. Installation of a parabolic longitudinal profile connection 3. Trace coordination in longitudinal profile **CHAPTER 5: CROSS PROFILE** 1. Definitions 2. Dimensioning of cross sections **CHAPTER 6: STUDY OF ROAD TRAFFIC** 1. Introduction 2. Traffic study approach 3. Analysis of the current situation 4. Traffic projection 5. Calculation of sizing traffic
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) Video projection
Reading list	B40 Normes techniques d'aménagement des routes MTP – Catalogue de dimensionnement de chaussées neuves MTP – Techniques de l'ingénieur – Routes T1 et 2 Coquand – Conception et construction des chaussées, Jeuffroy – Les normes tunisiennes pour le granulat, bitume et enrobés bitumeux – Les normes tunisiennes pour le granulats, bitume et enrobés bitumeux – www.lcpc.fr – www.brunel-ejm.com/bazaar/**cours**deroutev10.pdf

U3.4 : Project Implementation

Reinforced Concrete 1

Module designation	Project Implementation
Module level, if applicable	2nd year
Code, if applicable	U3.4
Subtitle, if applicable	****
Courses, if applicable	Reinforced Concrete 1
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Samy ANTIT
Language	French
Relation to curriculum	Professional module (compulsory), To introduce all aspects of Reinforced Concrete, area of use and different standard used to students.
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	Topography, DAO
Module objectives/intended learning outcomes	**Objectives:** 1. Understand the principles and rules of justification and sizing of reinforced concrete structural elements (columns, beams) according to the limit states method (according to Eurocode). 2. Understand the general mechanical behavior of reinforced concrete. 3. Become familiar with issues in the design and fabrication of reinforced concrete. **Outcomes :** Students will be able to: 1. Perform an industry relevant design project within teamwork. 2. Become familiar with the reinforced concrete fabrication and construction process 3. Students will be able to analyze and design for deflection and crack control of reinforced concrete

Content	**Chapter 1- General information on reinforced concrete** 1. Principle of transfer of forces between concrete and steel: adhesion phenomenon 2. Historical overview on the calculation methods of reinforced concrete structures **Chapter 2 - Presentation of the Eurocode** 1. Definition of Limit States 2. Presentation of actions 3. Presentation of the properties of materials and products 4. Design values of actions and effects of actions 5. Design values of resistances 6. Combinations of actions **Chapter III: Material behavior and durability** **Chap IV: Simple bending at the ULS** **Chap V: Posts in simple compression at ULS**
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) Video projection
Reading list	· *Pratique du BAEL 91 Cours avec exercices* * *Normalisation ;Normes de l'Eurocode ; EC0 et EC1* · *Pratique du béton précontraint. Dreux Edition Eyrolles.* · *Cours de Béton armé J. P Morgan* · *Le Béton précontraint aux états limites Henry Tonnier, Presse de l'Ecole Nationale Ponts et Chaussées.*

U3.4 : Project Implementation

Building Simulation (Arche)

Module designation	**Project Implementation**
Module level, if applicable	2nd year
Code, if applicable	U3.4
Subtitle, if applicable	****
Courses, if applicable	Building Simulation (Arche)
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Hedi AYED LAKHAL
Language	French
Relation to curriculum	Professional module (compulsory), Workshop to Familiarize with Computer Tools
Type of teaching, contact hours	30hours, of practical workshop in Lab 12 hours for Project
Workload	Total 56Hrs/Semester (14 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	Reinforced Concrete 1, Resistance Of Material , CAD 1 & 2, Theory of Structures 1
Module objectives/intended learning outcomes	**Objectives:** 1. Understand the design of a Concrete structure and all members. 2. Learn how to calculate the descent of loads and bracing with models combining traditional methods and sophisticated numerical modelling. **Outcomes:** Students will be able to: 1. Understand and know the fundamental principles of Building Performance Simulation, 2. Identify the most influencing design parameters, 3. Design new, advanced and high-performance building concepts

Content	**Part A. Arch Frame** ***1. General*** 1.1 User interface 1.1.1 Description of the screen 1.1.2 Application menus 1.1.3 Icon palettes 1.2 General approach 1.3 Building assumptions ***2 Entering elements*** 2.1 Choice of hanging mode 2.2 Choice of selection mode 2.3 Edit menu 2.3.1 Modify / Floors 2.3.2 Edit / Attributes 2.3.3 Modify / CAD 2.4 The elements 2.4.1 Help lines and construction queues 2.4.2 Construction elements 2.5 Display management 2.5.1 General display management 2.5.2 Display management by selection **Part B. Lowering loads** ***1 Regulatory Method*** 1.1 General principle of operation 1.2 Material characteristics 1.3 Loads taken into account 1.3.1 Nature of the loadings 1.3.2 Self-weight 1.3.3 Loads created by the user 1.4 Pre-sizing ***2 Finite element calculation*** 2.1 Principle of operation 2.2 Loadings taken into account 2.2.1 Vertical descent of loads 2.2.2 Climate efforts 2.2.3 Seismic forces 2.3 Characteristics of the structural elements 2.3.1 Beams 2.3.2 Column
Study and examination requirements and forms of examination	-100 % practical exam -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	GRAITEC User Manual

U3.5 Languages & Soft Skills
English TOEIC I

Module designation	**Languages & Soft Skills**
Module level, if applicable	2nd year
Code, if applicable	U3.5
Subtitle, if applicable	****
Courses, if applicable	English TOEIC 1
Semester (s) in which the module is taught	1 st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Nadia ZARDI
Language	English
Relation to curriculum	Transversal Subject (Soft Skills-Compulsory), Start preparation of Students for the TOEIC Exams 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	Upper intermediate level in both listening and reading skills.
Module objectives/intended learning outcomes	**Objectives:** 1. Prepare students to take TOEIC test by providing related necessary linguistic knowledge. 2. Familiarize with TOEIC testing using sample tests.. **Competencies:** Students will be able to: 1. General Competencies - Reach the highest score possible - Develop at most his/her Listening and reading skills. 2. Specific Competencies - Recognize the different parts of TOEIC. - Develop tactics and strategies appropriate to each type of activity, - Distinguish tasks to be performed in every activity. - Establish a proper pace to follow throughout the exam. - Managing allocated time. - Follow steps

Content	The course will be centered on lexical expansion, as a means to develop the students' knowledge of basic TOEIC terminology. An educational competence based approach is adopted, as well, to help students reach full potential and enhance their wide range of abilities. **Unit 1 Careers** Vocabulary builder: 1. Professions 2. Recruitment, job interview, temp agency 3. Job fair talks, training Grammar check: 1. Present simple/continuous 2. Why Questions 3. Suffixes **Unit 2 Workplaces** Vocabulary builder: 1. Office description (architecture, law, chemistry, mechanical Engineering, industry) 2. Technology and communication at work: hardware/ electrical equipment Grammar check: 1. Count/ non-count nouns 2. Prepositions: place, movement, time. **Unit 3 Communication** Vocabulary builder: 1. Internet (information technology) 2. Media: print media, broadcasting, news bulletin, postal services 3. Advertising: Commercials, banners, flyers… Grammar check: 1. Present perfect/ past simple 2. Compound nouns
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) Video projection, TOEIC preparation book,
Reading list	- Market leader, David cotton, David Falvey , Simon Ken; FINANCIAL TIMES (Pearson Longman) - Tactics for TOEIC® Listening and Reading Test: Grant Trew, OUP Oxford, 2007. - Target Score Student's: A Communicative Course for TOEIC® Test Preparation, Charles Talcott & Graham Tullis, Cambridge University Press, 2007 - Understanding and Using English Grammar, Betty Schrampfer Azar; Prentice Hall Regents; - YouTube Videos

U3.5 Languages & Soft Skills
Scientific Writing

Module designation	Languages & Soft Skills
Module level, if applicable	2nd year of engineering Cycle
Code, if applicable	U3.5
Subtitle, if applicable	-
Courses, if applicable	Scientific Writing
Semester (s) in which the module is taught	1 st Semester (S3)
Person responsible for the module	Dept. Head
Lecturer	Nadia ZARDI, Dr Issam Khezami
Language	English
Relation to curriculum	Professional Module, Compulsory
Type of teaching, contact hours	21 hours Seminar/ Projects
Workload	Total 42 Hours (21 Hours of Self Study)
Credit points	1.5
Requirements according to the examination regulations	-Minimum Attendance rate : 80% >20% of non-attendance= elimination for exams
Recommended prerequisites	English language skill (S1, S2)
Module objectives/intended learning outcomes	**Objectives:** 1. Learn how to write a clear and concise article that will appeal to a broad audience. **Learning Outcomes:** Students will be able to : 1. Write an abstract 2.Structure project data 3. Write a full publication (in Poster session)

Content	**Seminars/ Projects** **Chapter 1. Elements of writing style** In this chapter student will learn: • some simple changes you can make when writing to make your papers easier to read • how to use different paragraph types and transitions to create focus and flow in your manuscript • how to improve your writing style through exercises. **Chapter 2. Titles and abstracts** In this chapter student will learn: • what makes a good title • two easy-to-use abstract templates that you can apply directly to your own writing • what to avoid when writing titles and abstracts. **Chapter 3. From introduction to conclusion** In this chapter student will learn: • what should be included in, or excluded from, each section of the paper • how to organize your ideas effectively and avoid common mistakes • how to create a narrative flow to help readers follow your argument. **Chapter 4. Data management** In this chapter student will learn: • why it is important to accurately record, share and preserve your data • the best approaches to managing your research data • the importance of sharing your data and who might use it. **Chapter 5. Data presentation** In this chapter student will learn: • the four principles of creating clear and engaging figures for your paper • how to choose which figures to include in your manuscript • best practices in raw data processing and image preparation • tips to ensure that your figures are clear and informative for your readers. **Project :** **Content: Each Student will prepare a publication for the Poster session organized every year at the end of the Annual Project.**
Study and examination requirements and forms of examination	Evaluation of Publication, Poster and oral presentation (100%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection

Reading list	1. UC Berkeley Student Learning Center https://slc.berkeley.edu/writing-worksheets-and-other-writing-resources 2.

U3.5 Languages & Soft Skills
Corporate Management

Module designation	Languages & Soft Skills
Module level, if applicable	2nd year
Code, if applicable	U3.5
Subtitle, if applicable	****
Courses, if applicable	Corporate Management
Semester (s) in which the module is taught	1st semester (S3)
Person responsible for the module	Dr Issam Khezami
Lecturer	Yosra SAIDI CHAABANE
Language	French
Relation to curriculum	Transversal Subject (Soft Skills-Compulsory), Introduce Corporate Management to Students and help them prepare for their professional life.
Type of teaching, contact hours	21 hours, Seminar/ Projects
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	General Knowledge for Corporate and business practices
Module objectives/intended learning outcomes	**Objectives:** 1. Become familiar with the financial statements of companies. 2. The emphasis is on accounting concepts rather than accounting techniques 3. Understand all investments concepts

Content	**Seminar/ Projects** **Chapter 1: The basics of double-entry accounting:** 1. The need for an information system; 2. Accounting, an information system; 3. The balance sheet accounting equation; 4. Example illustrating the impact of a series of transactions on a company's balance sheet; 5. The statement of operations; 6. The statement of retained earnings; 7. The relationships between the balance sheet, the income statement and the statement of retained earnings. **Chapter 2: The various forms of business:** 1. The sole proprietorship; 2. The general partnership; 3. The social fund company; 4. Detailed examination of the elements of the shareholders' equity of a company with social funds: Share capital; 5. Retained earnings; 6. The dividends. ; 7. The obligations ; 8. Comparison of the three types of enterprises; 9. The cooperative. **Chapter 3: The use of journal entries and accounts:** 1. The use of journal entries; 2. The use of "accounts" 3. The three basic rules for recording transactions: • The duality of registration; • The orientation of the listing; • The time of registration. ; 4. The use of income and expense accounts; 5. Recording of sales and cost of sales. **Chapter 4: Measuring net profit:** 1. Distinction between revenue and income; 2. Distinction between disbursement and expenditure; 3. Cash accounting and accrual accounting; 4. The weaknesses of cash accounting; 5. Example illustrating the differences between cash accounting and accrual accounting, with respect to net income; 6. How to distinguish between an asset and an expense; 7. Relationships between disbursements, expenses and assets. **Chapter 5: Inventories:** 1. The elements of cost; 2. Inventory systems: Periodic; Permanent; Records of the permanent inventory system; 3. Logging in to newspapers; 4. Inventory valuation methods: • Own cost method; • Last invoice cost method; • Successive exhaustion method; • Reverse exhaustion method; • Weighted average cost method. ; 5. The cost or market value. **Chapter 6: Fixed assets and their depreciation:** 1. Fixed assets; 2. Two main classes of fixed assets; 3. The cost price of the asset;

	4. The specific case of government grants; 5. Capital expenditure and operating expenditure: • Definitions; • Importance of the distinction; • Depreciation book entry
Study and examination requirements and forms of examination	Format: Evaluation & Oral Presentation (100%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video Projection
Reading list	*« Eléments d'analyse financière » : R. DEROME ; L. LEFEBVRE (Education et Culture INC. CEC)*