الجمهورية الجزائرية الديمقراطية الشعبية
Democratic and Popular Algerian Republic
وزارة التعليم العالي والبحث العلمي
Ministry of Higher Education and Scientific Research

University
Mohamed Seddik Benyahi
- jijel-

TRAINING OFFER
LMD
ACADEMIC BACHELOR

NATIONAL PROGRAM
2018– 2019

Establishment	Faculty / Institute	Department

Domain	Sector	Speciality
Sciences and Technology	***Civil Engineering***	***Civil Engineering***

I–License Identity Card

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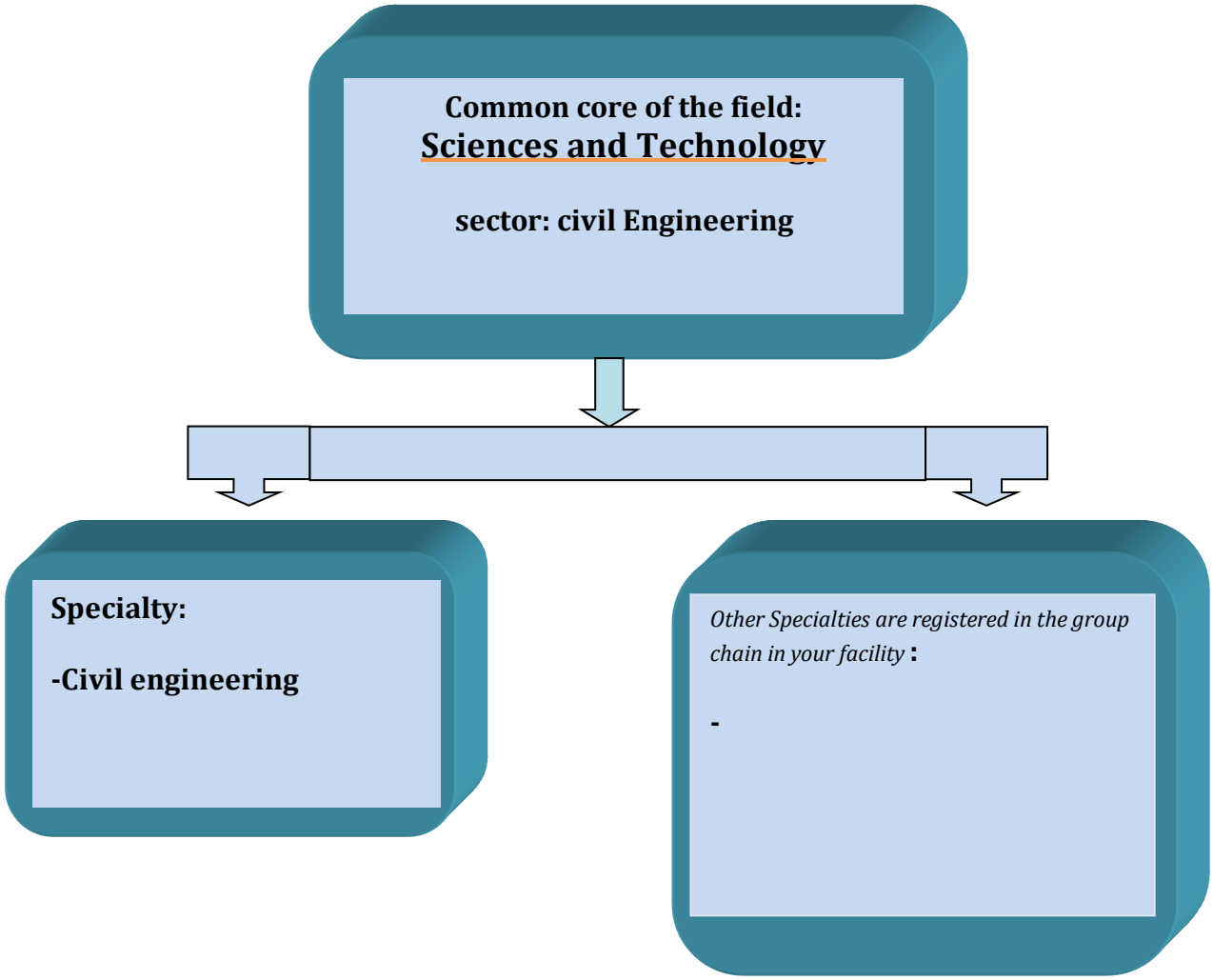


II – Half-yearly teaching organization sheets of the specialty

Semester 1(Common Core – Science and Technology)

Teaching unit	Materials Titled	Credits	Coefficient	Weekly hourly volume			Half-yearly Hourly Volume (15 weeks)	Additional Work in Consultation (15 weeks)	Assessment method	
				Course	Practical work	laboratory work			Continuous Assessment	Exam
Fundamental EU Code : UEF 1.1 Credits : 18 Coefficients : 9	Mathematics 1	6	3	3h00	1h30		67h30	82h30	40%	60%
	Physics 1	6	3	3h00	1h30		67h30	82h30	40%	60%
	Structure of matter	6	3	3h00	1h30		67h30	82h30	40%	60%
Methodological EU Code : UEM 1.1 Credits : 9 Coefficients : 5	Physics 1 (laboratory work)	2	1			1h30	22: 30	27h30	100%	
	Chemistry 1(laboratory work)	2	1			1h30	22 h30	27h30	100%	
	Computer Science 1	4	2	1h30		1h30	45h00	55h00	40%	60%
	Writing methodology	1	1	1h00			15h00	10h00		100%
EU Discovery Code : UED 1.1 Credits : 1 Coefficients : 1	Careers in science and technologies 1	1	1	1h30			22h30	02h30		100%
Transversal EU Code : UET 1.1 Credits : 2 Coefficients : 2	foreign Language 1 (French and/or English)	2	2	3h00			45h00	05h00		100 %
Total semester 1		**30**	**17**	**16h00**	**4h30**	**4h30**	**16h00**	**375 hours**		

Semester 2(Common Core – Science and Technology)

Teaching unit	Materials Titled	Credits	Coefficient	Weekly hourly volume			Half-yearly Hourly Volume (15 weeks)	Additional Work in Consultation (15 weeks)	Assessment method	
				Course	Practical work	laboratory work			Continuous Assessment	Exam
Fundamental EU Code : UEF 1.2 Credits : 18 Coefficients : 9	Mathematics 2	6	3	3h00	1h30		67h30	82h30	40%	60%
	Physics 2	6	3	3h00	1h30		67h30	82h30	40%	60%
	Thermodynamics	6	3	3h00	1h30		67h30	82h30	40%	60%
Methodological EU Code : UEM 1.2 Credits : 9 Coefficients : 5	Physics 2 laboratory work	2	1			1h30	22h30	27h30	100%	
	Chemistry 2(laboratory work)	2	1			1h30	22h30	27h30	100%	
	Computer Science 2	4	2	1h30		1h30	45h00	55h00	40%	60%
	Presentation methodology	1	1	1h00			15h00	10h00		100%
Discovery EU Code : UED 1.2 Credits : 1 Coefficients : 1	Careers in science and technologies 2	1	1	1h30			22h30	02h30		100%
Transversal EU Code : UET 1.2 Credits : 2 Coefficients : 2	foreign Language 2 (French and/or English)	2	2	3h00			45h00	05h00		100 %
Total semester 2		**30**	**17**	**16h00**	**4h30**	**4h30**	**375h00**	**375h00**		

Semester 3(Common Core - Civil Engineering)

Teaching unit	Materials Titled	Credits	Coefficient	Weekly hourly volume			Half-yearly Hourly Volume (15 weeks)	Additional Work in Consultation (15 weeks)	Assessment method	
				Course	Practical work	laboratory work			Continuous Assessment	Exam
Fundamental EU Code : UEF 2.1.1 Credits : 10 Coefficients : 5	Mathematics 3	6	3	3h00	1h30		67h30	82h30	40%	60%
	Waves and vibrations	4	2	1h30	1h30		45h00	55h00	40%	60%
Methodological EU Code : UEF 2.1.2 Credits : 8 Coefficients : 4	fluid Mechanics	4	2	1h30	1h30		45h00	55h00	40%	60%
	Rational mechanics	4	2	1h30	1h30		45h00	55h00	40%	60%
Methodological EU Code : UEM 2.1 Credits : 9 Coefficients : 5	Probability and statistics	4	2	1h30	1h30		45h00	55h00	40%	60%
	Computer Science 3 (laboratory work)	2	1			1h30	22h30	27h30	100%	
	Engineering graphics (laboratory work)	2	1			1h30	22h30	27h30	100%	
	Waves and vibrations 2 (laboratory work)	1	1			1h00	15h00	10h00	100%	
EU-Discovery Code : UED 2.1 Credits : 2 Coefficients : 2	Basic Technology	1	1	1h30			22h30	02h30		100%
	Metrology	1	1	1h30			22h30	02h30		100%
Transversal EU Code : UET 2.1 Credits : 1 Coefficients : 1	Technical English	1	1	1h30			22h30	02h30		100%
Total semester 3		**30**	**17**	**16h00**	**4h30**	**4h30**	**375h00**	**375h00**		

Semester 4 (Common Core - Civil Engineering)

Teaching unit	Materials Titled	Credits	Coefficient	Weekly hourly volume			Half-yearly Hourly Volume (15 weeks)	Additional Work in Consultation (15 weeks)	Assessment method	
				Course	Practical work	laboratory work			Continuous Assessment	Exam
Fundamental EU Code : UEF 2.2.1 Credits : 6 Coefficients : 3	soil Mechanics	4	2	1h30	1h30		45h00	55h00	40%	60%
	Construction Materials	2	1	1h30			22h30	27h30		100%
Fundamental EU Code : UEF 2.2.2 Credits : 8 Coefficients : 4	Mathematics 4	4	2	1h30	1h30		45h00	55h00	40%	60%
	Numerical Methods	4	2	1h30	1h30		45h00	55h00	40%	60%
Fundamental EU Code : UEF 2.2.3 Credits : 4 Coefficients : 2	Strength of materials	4	2	1h30	1h30		45h00	55h00	40%	60%
Methodological EU Code : UEM 2.2 Credits : 9 Coefficients : 5	soil Mechanics	2	1			1h30	22h30	27h30	100%	
	Construction materials	2	1			1h30	22h30	27h30	100%	
	Computer aided drawing	2	1			1h30	22h30	27h30	100%	
	Numerical Methods	2	1			1h30	22h30	27h30	100%	
	fluid mechanics & Strength of materials	1	1			1h00	15h00	10h00	100%	
EU-Discovery Code : UED 2.2 Credits : 2 Coefficients : 2	Geology	1	1	1h30			22h30	02h30		100%
	Topography 1	1	1	1h30			22h30	02h30		100%
Transversal EU Code : UET 2.2 Credits : 1 Coefficients : 1	Expression and communication techniques	1	1	1h30			22h30	02h30		100%
Total semester 4		**30**	**17**	**12h00**	**6h00**	**7h00**	**375h00**	**375h00**		

Semester 5 (Civil Engineering)

Teaching unit	Materials Titled	Credits	Coefficient	Weekly hourly volume			Half-yearly Hourly Volume (15 weeks)	Additional Work in Consultation (15 weeks)	Assessment method	
				Course	Practical work	laboratory work			Continuous Assessment	Exam
Fundamental EU Code : UEF 3.1.1 Credits : 12 Coefficients : 6	Strength of Materials 2	4	2	1h30	1h30		45h00	45h00	40%	60%
	Reinforced concrete 1	4	2	1h30	1h30		45h00	45h00	40%	60%
	steel Structures	4	2	1h30	1h30		45h00	45h00	40%	60%
Fundamental EU Code : UEF 3.1.2 Credits : 6 Coefficients : 3	Soil Mechanics 2	4	2	1h30	1h30		45h00	45h00	40%	60%
	Construction Materials 2	2	1	1h30			22h30	27h30		100%
Methodological EU Code : UEM 3.1 Credits : 9 Coefficients : 5	Topography (Practical work)	2	1			1h30	22h30	27h30	100%	
	soil Mechanics 2 (laboratory work)	2	1			1h30	22h30	27h30	100%	
	Construction Materials 2 (laboratory work)	2	1			1h30	22h30	27h30	100%	
	buildings graphics	3	2			2h30	37h30	37h30	100%	
EU-Discovery Code : UED 3.1 Credits : 2 Coefficients : 2	Topography 2	1	1	1h30			22h30	02h30		100%
	Hydraulic general	1	1	1h30			22h30	02h30		100%
Transversal EU Code : UET 3.1 Credits : 1 Coefficients : 1	Principles and rules of construction	1	1	1h30			22h30	02h30		100%
Total semester 5		**30**	**17**	**12h00**	**6h00**	**7h00**	**375h00**	**375h00**		

License Title: Civil Engineering

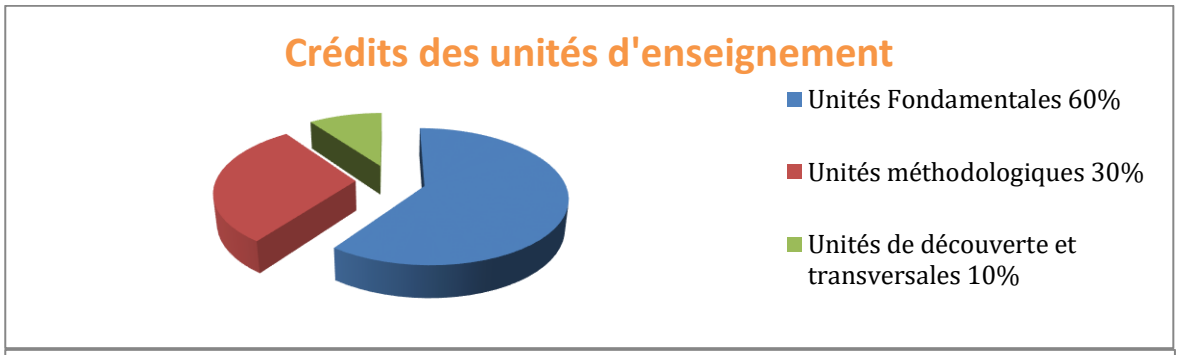
Semester 6 (Civil Engineering)

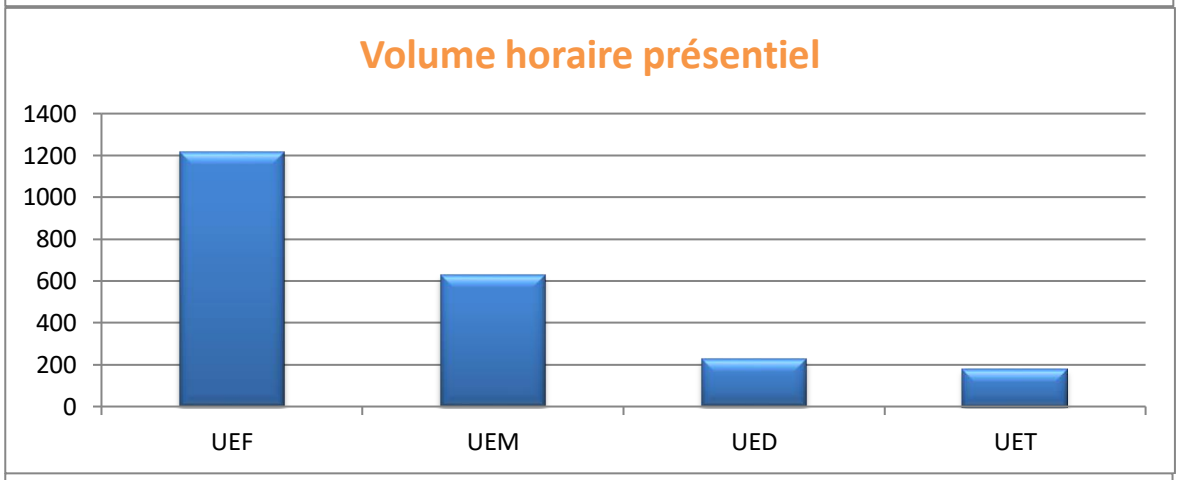
Teaching unit	Materials Titled	Credits	Coefficient	Weekly hourly volume			Half-yearly Hourly Volume (15 weeks)	Additional Work in Consultation (15 weeks)	Assessment method	
				Course	Practical work	laboratory work			Continuous Assessment	Exam
Fundamental EU Code : UEF 3.2.1 Credits : 8 Coefficients : 4	Structural Analysis	4	2	1h30	1h30		45h00	55h00	40%	60%
	Steel Design	4	2	1h30	1h30		45h00	55h00	40%	60%
Fundamental EU Code : UEF 3.2.2 Credits : 10 Coefficients : 5	Reinforced Concrete 2	6	3	3h00	1h30		67h30	82h30	40%	60%
	Foundations and Geotechnical structures	4	2	1h30	1h30		45h00	55h00	40%	60%
Methodological EU Code : UEM 3.2 Credits : 9 Coefficients : 5	End of Cycle Project	4	2			3h00	45h00	55h00	100%	
	Computer-Aided Design	3	2			2h30	37h30	37h30	100%	
	Quantities and Cost Estimation	2	1	1h30			22h30	27h30		100%
EU-Discovery Code : UED 3.2 Credits : 2 Coefficients : 2	VRD	1	1	1h30			22h30	02h30		100%
	sites Organization	1	1	1h30			22h30	02h30		100%
Transversal EU Code : UET 3.2 Credits : 1 Coefficients : 1	Professional Project And Business Management	1	1	1h30			22h30	02h30		100%
Total semester 6		**30**	**17**	**13h30**	**6h00**	**5h30**	**375h00**	**375h00**		

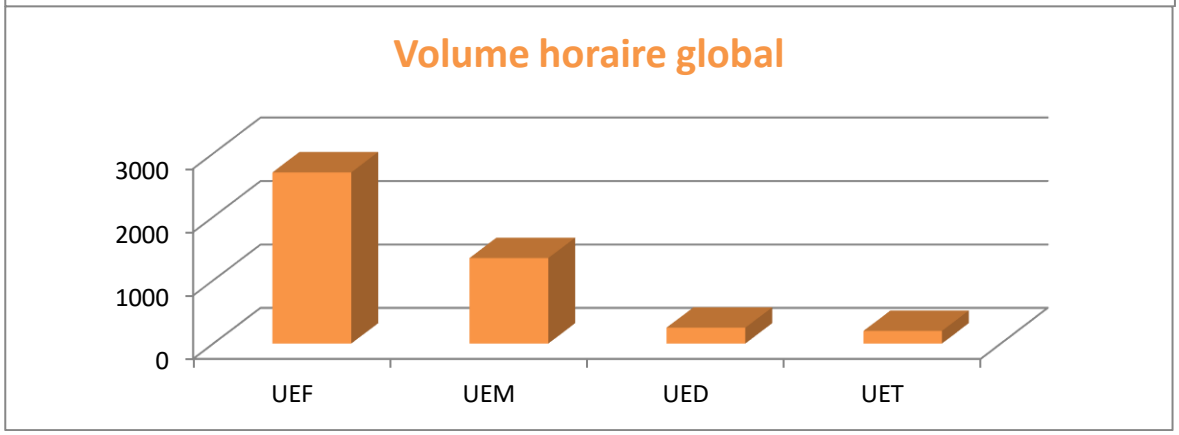
The assessment methods presented in these tables are given for information purposes only; the establishment's training team may suggest.

Overall training summary

UE / VH	UEF	UEM	UED	UET	Total
Cours	720h00	120h00	225h00	180h00	1245h00
Practical work	495h00	22h30	---	---	517h30
Laboratory work	---	487h30	---	---	487h30
Personal work	1485h00	720h00	25h00	20h00	2250h00
Other (specify)	---	---	---	---	---
Total	2700h00	1350h00	250h00	200h00	4500h00
Crédits	108	54	10	8	180
% in credits for each EU	60 %	30 %	10 %		100 %







III - Detailed program by subject

Semester: 1
Teaching unit: UEF 1.1
Subject 1: Mathematics 1
VHS: 67h30 (Course: 3h00, TD: 1h30)
Credits: 6
Coefficient: 3

Teaching objectives

This first mathematics subject is particularly dedicated to standardizing the level of students entering university. The first new elements are taught progressively in order to lead students towards more advanced mathematics. The concepts covered in this subject are fundamental and among the most used in the field of Science and Technology.

Recommended prior knowledge

Basics of Mathematics final year classes (sets, functions, equations, etc.).

Course Content:

Chapter 1.Methods of mathematical reasoning (1 Week)
1-1 Direct reasoning. 1-2 Reasoning by contraposition. 1-3 Reasoning by contradiction. 1-4 Reasoning by counterexample. 1-5 Reasoning by recurrence.
Chapter 2.Sets, relations and applications (2 Weeks)
2.1 Set theory. 2-2 Order relations, Equivalence relations. 2-3 Injective, surjective, bijective applications: definition of an application, direct image, reciprocal image, characteristic of an application.
Chapter 3. Real functions with one real variable (3 Weeks)
3-1 Limit, continuity of a function. 3-2 Derivative and differentiability of a function.
Chapter 4. Application to elementary functions (3 Weeks)
4-1 Power Function. 4-2 Logarithmic Function. 4-3 Exponential Function. 4-4 Hyperbolic Function. 4-5 Trigonometric Function. 4-6 Inverse Function
Chapter 5. Limited development (2 Weeks)
5-1 Taylor's formula. 5-2 Limited development. 5-3 Applications.
Chapter 6. Linear algebra (4 Weeks)
6-1 Laws and internal composition. 6-2 Vector space, basis, dimension (definitions and elementary properties). 6-3 Linear application, kernel, image, rank.

Assessment method

Continuous assessment: 40%; Exam: 60%.

Bibliography

1. K. Allab, Eléments d'analyse, Fonction d'une variable réelle, 1re & 2e années d'université, Office des Publications universitaires.
2. J. Rivaud, Algèbre : Classes préparatoires et Université Tome 1, Exercices avec solutions, Vuibert.
3. N. Faddeev, I. Sominski, Recueil d'exercices d'algèbre supérieure, Edition de Moscou
4. M. Balabne, M. Duflo, M. Frish, D. Guegan, Géométrie – 2e année du 1er cycle classes préparatoires, Vuibert Université.
5. B. Calvo, J. Doyen, A. Calvo, F. Boshet, Exercices d'algèbre, 1er cycle scientifique préparation aux grandes écoles 2e année, Armand Colin – Collection U.
6. J. Quinet, Cours élémentaire de mathématiques supérieures 1- Algèbre, Dunod.
7. J. Quinet, Cours élémentaire de mathématiques supérieures 2- Fonctions usuelles, Dunod.
8. J. Quinet, Cours élémentaire de mathématiques supérieures 3- Calcul intégral et séries, Dunod.

9. J. Quinet, Cours élémentaire de mathématiques supérieures 4- Equations différentielles, Dunod.

Semester: 1
Teaching unit: UEF 1.1
Subject 2: Physics 1
VHS: 67h30 (course: 3h00, TD: 1h30)
Credits: 6
Coefficient: 3

Teaching objectives

Introduce the student to the basics of Newtonian physics through three main parts: Kinematics, Dynamics and Work and Energy.

Recommended prior knowledge

Notions of mathematics and physics.

Course Content:

Mathematical reminders (2 Weeks)

1- The dimensional equations
2-Vector calculus: scalar product (norm), vector product, multivariate functions, derivation.
Vector analysis: gradient, rotational operators, etc.

Chapter 1. Kinematic (5 Weeks)

1- Position vector in coordinate systems (Cartesian, cylindrical, spherical, curvilinear) - law of motion - Trajectory. 2- Velocity and acceleration in coordinate systems. 3- Applications: Movement of the material point in different coordinate systems. 4- Relative movement.

Chapter 2. Dynamic: (4 Weeks)

1- General: Mass - Force - Moment of force - Absolute and Galilean reference frame. 2- Newton's laws. 3- Principle of conservation of momentum. 4- Differential equation of motion.
5- Angular momentum. 6- Applications of the fundamental law for forces (constant, time dependent, speed-dependent, central force, etc.).

Chapter 3.Work and energy (4 Weeks)

1- Work of a force. 2- Kinetic energy. 3- Potential energy – Examples of potential energy (gravity, gravitational, elastic). 4- Conservative and non-conservative forces - Total energy theorem.

Assessment method:

Continuous assessment: 40%; Exam: 60%.

Bibliography:

1. A. Gibaud, M. Henry ; Cours de physique - Mécanique du point - Cours et exercices corrigés; Dunod, 2007.
2. P. Fishbane et al. ; Physics For Scientists and Engineers with Modern Physics, 3rd Ed. ; 2005.
3. P. A. Tipler, G. Mosca ; Physics For Scientists and Engineers, 6th Ed., W. H. Freeman Company, 2008.

Semester: 1
Teaching unit: UEF1.1
Subject 3: Structure of matter
VHS: 67h30 (course: 3h00, Tutorial: 1h30)
Credits: 6
Coefficient: 3

Teaching objectives

The teaching of this subject allows the student to acquire the basic formalisms in chemistry, particularly within the subject describing the atom and the chemical bond, the chemical elements and the periodic table with energy quantification. Making students better able to solve chemistry problems.

Recommended prior knowledge

Basic concepts of mathematics and general chemistry.

Course Content:

Chapter 1:Basic concepts (2 Weeks)

Macroscopic states and characteristics of the states of matter, changes in states of matter, concepts of atom, molecule, mole and Avogadro's number, atomic mass unit, atomic and molecular molar mass, molar volume, Law of mass: Conservation of mass (Lavoisier), chemical reaction, Qualitative aspect of matter, Quantitative aspect of matter.

Chapter 2:Main constituents of matter (3 Weeks)

Introduction: Faraday's Experiment: Relationship between Matter and Electricity**,** Highlighting the constituents of matter and therefore of the atom and**,**some physical properties (mass and charge), Rutherford planetary model, Presentation and characteristics of the atom (Symbol, atomic number Z, mass number A, number of protons, neutrons and electrons), Isotopy and relative abundance of different isotopes, Separation of isotopes and determination of the atomic mass and the average mass

of an atom: Mass spectrometry: Bainbridge spectrograph, Binding and cohesion energy of nuclei, Stability of nuclei.

Chapter 3: Radioactivity – Nuclear Reactions (2 Weeks)

Natural radioactivity (radiationalpha, βAndγ), Artificial radioactivity and nuclear reactions, Kinetics of

radioactive decay, Applications of radioactivity.

Chapter 4:Electronic structure of the atom (2 Weeks)

Wave-particle duality, Interaction between light and matter, Bohr's atomic model: hydrogen atom, The

hydrogen atom in wave mechanics, Polyelectronic atoms in wave mechanics.

Chapter 5:Periodic table of elements (3 Weeks)

D. Mendeleev's Periodic Classification, Modern Periodic Classification, Evolution and periodicity of physicochemical properties of elements, Calculation of radii (atomic and ionic), successive ionization energies, electron affinity and electronegativity (Mulliken scale) by Slater's rules.

Chapter 6:Chemical bonds (3 Weeks)

Covalent bonding in Lewis theory, Polarized covalent bonding, dipole moment and partial ionic character of the bond, Geometry of molecules: Gillespie theory or VSEPR, Chemical bonding in the quantum model.

Assessment method:

Continuous assessment: 40%; Exam: 60%.

Bibliography

License Title: Civil Engineering

1. Ouahes, Devallez, Chimie Générale, OPU.
2. S.S. Zumdhal & coll., Chimie Générale, De Boeck Université.
3. Y. Jean, Structure électronique des molécules : 1 de l'atome aux molécules simples, 3e éd, Dunod, 2003.
4. F. Vassaux, La chimie en IUT et BTS.
5. A. Casalot & A. Durupthy, Chimie inorganique cours 2ème cycle, Hachette.
6. P. Arnaud, Cours de Chimie Physique, Ed. Dunod.
7. M. Guymont, Structure de la matière, Belin Coll., 2003.
8. G. Devore, Chimie générale : T1, étude des structures, Coll. Vuibert, 1980.
9. M. Karapetiantz, Constitution de la matière, Ed. Mir, 1980.

Semester: 1
Teaching unit: UEF1.1
Teaching unit: UEM 1.1
Subject 1: TP Physique 1
VHS: 22h30 (TP: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

Consolidate the theoretical knowledge provided in the course through a number of practical exercises.

Recommended prior knowledge

Notions of mathematics and physics.

Course Content:

5 manipulations minimum (3 hours / 15 days):

- Methodology for presenting practical work reports and calculating errors.
- Verification of Newton's 2nd law
- Free fall
- Simple pendulum
- Elastic collisions
- Inelastic collisions
- Moment of inertia.
- Centrifugal force.

Assessment method:

Continuous assessment: 100%.

Semester: 1
Teaching unit: UEF1.1
Subject 2: Chemistry 1 Practical Work
VHS: 22h30 (TP: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

Consolidate the theoretical knowledge provided during the structure of matter course through a number of practical exercises.

Recommended prior knowledge

Basic Chemistry Concepts.

Course Content:

1.Safety in the laboratory
2.Preparation of solutions
3. Notions on uncertainty calculations applied to chemistry.
4. Acid-base dosage by colorimetry and pH-metry.
5. Acid-base dosage by conductivity meter.
5. Oxidation-reduction assay
6. Determination of water hardness
7. Determination of ions in water: determination of chloride ions by the Mohr method.

Assessment method:

Continuous assessment: 100%.

Semester: 1
Teaching unit: UEF1.1
Subject 3: Computer Science 1
VHS: 45h00 (course: 1h30, Practical work: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

The objective of the subject is to enable students to learn to program using a high-level language (Fortran, Pascal, or C). The choice of language is left to the discretion of each institution. The concept of algorithms must be implicitly addressed during language learning.

Recommended prior knowledge

Basic concepts of web technology.

Course Content:

Part 1. Introduction to Computer Science (5 Weeks)
1- Definition of computing
2- Evolution of computing and computers
3- Information coding systems
4- Operating principle of a computer
5- Hardware part of a computer
6- System part
Basic systems (operating systems (Windows, Linux, Mac OS, ...)
Programming languages, application software

Part 2. Concepts of algorithm and program (10Weeks)

1- Concept of an algorithm
2- Organizational chart representation
3- Structure of a program
4- The approach and analysis of a problem
5- Data structure: Constants and variables, Data types
6- Operators: assignment operator, relational operators, logical operators, arithmetic operations, priorities in operations
7- Input/output operations
8- Control structures: Conditional control structures, Repetitive control structures

Computer Science 1 (practical work):

The practical exercises are intended to illustrate the concepts taught during the course. These exercises should begin with the lessons according to the following schedule:

- Introductory and advanced practical work familiarization with the computer machine from a hardware and operating system point of view (exploration of the different functionalities of the OS).
- Practical work on the use of a programming environment (Editing, Assembly, Compilation, etc.).
- application of programming techniques seen in class.

Assessment method:

Continuous assessment: 40%; Exam: 60%.

Bibliography

1. John Paul Mueller et Luca Massaron, Les algorithmes pour les Nuls grand format, 2017.
2. Charles E. Leiserson, Clifford Stein et Thomas H. Cormen, Algorithmique: cours avec 957 exercices et 158 problèmes, 2017.
3. Thomas H. Cormen, Algorithmes: Notions de base, 2013.

Semester: 1
Teaching unit: UEM1.1
Subject 4: Writing Methodology
VHS: 15h00 (course: 1h00)
Credits: 1
Coefficient: 1

Teaching objectives

To familiarize and train students with current concepts of writing methodology in force in the Science and Technology profession. Among the skills to be acquired: Knowing how to present oneself; Knowing how to write a CV and a cover letter; Knowing how to position oneself in writing or orally in relation to an opinion or an idea; Mastering syntax and spelling in writing.

Recommended prior knowledge

Basic French. Basic principle of writing a document.

Course Content:

Chapter 1. Concepts and generalities on writing techniques (2 Weeks)
- Definitions, standards
-Applications: writing a summary, a letter, a request

Chapter 2. Information research, synthesis and exploitation (3 Weeks)
-Searching for information in the library (Paper format: Books, Magazines)
-Searching for information on the Internet (Digital: Databases; Search engines, etc.).
-Applications

Chapter 3 Techniques and procedures of writing (3 Weeks)
-Basic Principles of Writing - Punctuation, Syntax, Sentences
-The length of sentences
-Division into paragraphs
-Using a neutral style and writing in the third person
-Readability
-Objectivity
-Intellectual rigor and plagiarism

Chapter 4 Writing a Report (4 Weeks)
Cover pages, Summary, Introduction, Method, Results, Discussion, Conclusion, Bibliography, Appendices, Summary and Keywords

Chapter 5. Applications (3 Weeks)
Report of a practical work

Assessment method:

Control Exam: 100%.

Bibliography:

1. J.-L. Lebrun, Guide pratique de rédaction scientifique, EDP Sciences, 2007.
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9. G. Andreani, La pratique de la correspondance, Hachette, 1995.
10. Ph. Rubens, Science & Technical Writing, A Manual of Style, 2d ed, Routledge, 2001.
11. A. Wallwork, User Guides, Manuals, and Technical Writing – A Guide to Professionnal English, Springer, 2014.

Semester: 1
Teaching unit: UED1.1
Subject 1: Careers in Science and Technology 1
VHS: 22h30 (course: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

To introduce the student, in a first step, to all the sectors covered by the Science and Technology Field and in a second step to a range of careers that these sectors lead to. In the same context, this subject introduces the new challenges of sustainable development as well as the new careers that can result from it.

Course Content:

1.What is engineering science? (2 weeks)

The engineering profession, history and challenges of the 21st century, Search for a profession/recruitment advertisement by keyword, develop a simple job description (job title, company, main activities, skills required (knowledge, know-how, interpersonal skills)

2.Electronics, Telecommunications, Biomedical Engineering, Electrotechnics, Electromechanics, Optics & Precision Mechanics: **(2 weeks)**

- Definitions, areas of application (Home automation, embedded applications for automobiles, Video surveillance, Mobile telephony, Optical fiber, Advanced scientific instrumentation, Imaging and Instrumentation medical, Giant mirrors, Contact lenses, Transport and distribution of electrical energy, Power generation plants, Energy efficiency, Maintenance of industrial equipment, Elevators,

Wind Turbines, …

- Role of the specialist in these areas.

3.Automation and Industrial Engineering sectors: (1 week)

- Definitions, areas of application (Automated industrial chains, Numerical Control Machine Tools, Robotics, Inventory Management, Goods Traffic Management, Quality, - Role of the specialist in these areas.

4.Process Engineering, Hydrocarbons and Petrochemical Industries:

(2 weeks)
- Definitions, Pharmaceutical industry, Food industry, Leather and textile industry, Biotechnologies, Chemical and petrochemical industry,Plastics industry, Energy sector (oil, gas), …
- Role of the specialist in these areas.

5. Sustainable development (SD): (4 weeks)

Definitions, Global issues (climate change, demographic transitions, resource depletion (oil, gas, coal, etc.), biodiversity loss, etc.), SD diagram (Sustainable = Viable + Livable + Equitable), SD actors (governments, citizens, socio-economic sector, international organizations, etc.), Global nature of SD challenges

6. Sustainable engineering: (4 weeks)

Definition, Principles of sustainable engineering (definitions of: sustainable energy/energy efficiency, sustainable mobility/ecomobility, resource recovery (water, metals and minerals, etc.), sustainable production), Relevance of sustainable engineering in S&T sectors, Relationship between sustainability and engineering, Responsibility of engineers in the implementation of sustainable projects, etc.

Student's personal work for this subject:

The teacher in charge of this subject can let his students know that he can always assess them by asking them to prepare job sheets. Ask the students to watch a popular science film at home related to the chosen job (after giving them either the film electronically or giving them the internet link to this

film) and then ask them to submit a written report or make an oral presentation of the summary of this film, etc. The improvement of these activities is left to the discretion of the teacher and the training team who are the only ones able to define the best way to take this personal work into account In the overall grade of the final exam.

Group work:
Development of job descriptions for professions in each sector based on recruitment advertisements found on application sites job (eg http://www.onisep.fr/Decouvrir-lesmetiers, www.indeed.fr, www.pole-emploi.fr)(1 sector / group).
Depending on the capacity of the establishments, recommend calling on doctoral students and former graduates of the establishment in a tutoring/mentoring system where each group can call on its tutor/mentor to develop the job description/discover the different ST professions.

Assessment method:

100% exam.

Bibliography:

1. Quels métiers pour demain ? Éditeur : ONISEP, 2016, Collection : Les Dossiers.
2. J. Douënel et I. Sédès, Choisir un métier selon son profil, Editions d'Organisation, Collection : Emploi & carrière, 2010.
3. V. Bertereau et E. Ratière, Pour quel métier êtes-vous fait ? Editeur : L'Étudiant, 6e édition, Collection : Métiers, 2015.
4. Le grand livre des métiers, Éditeur : L'Étudiant, Collection : Métiers, 2017.
5. Les métiers de l'industrie aéronautique et spatiale, Collection : Parcours, Edition : ONISEP, 2017.
6. Les métiers de l'électronique et de la robotique, Collection : Parcours, Edition : ONISEP, 2015.
7. Les métiers de l'environnement et du développement durable, Collection : Parcours, Edition : ONISEP, 2015.
8. Les métiers du bâtiment et des travaux publics, Collection : Parcours, Edition : ONISEP, 2016.
9. Les métiers du transport et de la logistique, Collection : Parcours, Edition : ONISEP, 2016.
10. Les métiers de l'énergie, Collection : Parcours, Edition : ONISEP, 2016.
11. Les métiers de la mécanique, Collection : Parcours, Edition : ONISEP, 2014.
12. Les métiers de la chimie, Collection : Parcours, Edition : ONISEP, 2017.
13. Les métiers du Web, Collection : Parcours, Edition : ONISEP, 2015.
14. Les métiers de la biologie, Collection : Parcours, Edition : ONISEP, 2016.

Semester: 1
Teaching unit: UET1.1
Subject 1: French language 1
VHS: 22h30 (course: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

This subject aims to develop the following four skills: Oral comprehension, Written comprehension, Oral expression and Written expression through reading and studying texts.

Recommended prior knowledge:

Basic French.

Course Content:

Below we offer a set of themes that cover fundamental sciences, technologies, economics, social issues, communication, sports, health, etc. The teacher can choose texts from this list to develop them during the course. Otherwise, they are free to address other themes of their choice. The texts can be borrowed from various communication media: daily newspapers, sports or entertainment magazines, specialized or popular magazines, books, websites, audio and video recordings, etc.

For each text, the teacher helps the student develop their linguistic skills: listening, comprehension, and oral and written expression. In addition, they must use this text to identify the grammatical structures they will develop during the same class session. Here, for illustration purposes, we recall a set of grammatical structures that can be developed as examples. Of course, it is not a question of developing them all or in the same way. Some can be recalled and others in great detail.

Examples of themes	Grammatical structures
Climate change Pollution The electric car The robots Artificial intelligence The Nobel Prize The Olympic Games Sports at school The Sahara The currency Assembly line work Ecology Nanotechnologies Optical fiber The engineering profession The power plant Energy efficiency The smart building Wind energy Solar energy	Punctuation. Proper nouns, Articles. Grammatical functions: The noun, The verb, The pronouns, The adjective, The adverb. The complement pronoun ''le, la, les, lui, leur, y, en, me, te, …'' The agreements. The negative sentence. Don't…, Don't… yet, Don't… anymore, Don't… ever, Don't… point, … The interrogative sentence. Question with "Who, What, What", Question with "When, Where, How much, Why, How, Which, Which". The exclamatory sentence. Reflexive verbs. Impersonal verbs. The indicative tenses: Present, Future, Past Perfect, Simple Past, Imperfect. …

Assessment method:

100% exam.

Bibliography:

1. M. Badefort, Objectif : Test de Français International, Edulang, 2006.
2. O. Bertrand, I. Schaffner, Réussir le TCF, Exercices et activités d'entrainement, Les éditions de l'école polytechnique, 2009.

License Title: Civil Engineering

3. M. Boulares, J.-L. Frerot, Grammaire progressive du Français avec 400 exercices, Niveau avancé, CLE International.

4. Collectif, Besherelles : la Grammaire pour tous, Hatier.

5. Collectif, Besherelles : la Conjugaison pour tous, Hatier.

6. M. Grégoire, Grammaire progressive du Français avec 400 exercices, Niveau débutant, CLE International, 1997.

7. A. Hasni et al., La formation à l'enseignement des sciences et des technologies au secondaire, Presses de l'université du Québec, 2006.

8. J.-L. Lebrun, Guide pratique de la rédaction scientifique, EDP Sciences, 2007.

9. J.M. Robert, Difficultés du Français, Hachette,

10. C. Tisset, Enseigner la langue française à l'école : La Grammaire, L'Orthographe et la Conjugaison, Hachette Education, 2005.

11. J. Bossé-Andrieu, Abrégé des Règles de Grammaire et d'Orthographe, Presses de l'université du Québec, 2001.

12. J.-P. Colin, Le français tout simplement, Eyrolles, 2010.

13. Collectif, Test d'évaluation de Français, Hachette, 2001.

14. Y. Delatour et al., Grammaire pratique du Français en 80 fiches avec exercices corrigées, Hachette, 2000.

15. Ch. Descotes et al., L'Exercisier : l'expression française pour le niveau intermédiaire, Presses Universitaires de Grenoble, 1993.

16. H. Jaraush, C. Tufts, Sur le Vif, Heinle Cengage Learning, 2011.

17. J. Dubois et al, Les indispensables – Orthographe, Larousse, 2009.

Semester: 1
Teaching unit: UET1.1
Subject 1 : English language 1
VHS: 22h30 (course: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

Develop the reading, writing, listening and speaking abilities of the students.

Recommended prior Knowledge:

Basic English.

Contents:

The English syllabus consists of a set of texts containing scientific and technical parts. The chosen texts must be used to study scientific and technical English and Grammar acquisition.
The texts must be selected according to the vocabulary built up, familiarization with both scientific and technical matters in English for further understanding. Therefore, each text will be defined by a set of vocabulary concepts, a set of special sentences (idioms) and comprehension questions.
The texts must contain also a terminology which means the translation of some words from English to French one. Besides, the activity at the end of each session must include a translation of long statements which are selected from the texts.

Examples for some lectures:	Examples of Word Study: Patterns
Iron and Steel	Make + Noun + Adjective
Heat Treatment of Steel.	Quantity, Contents
Lubrication of Bearings.	Enable, Allow, Make, etc. + Infinitive
The Lathe.	Comparative, Maximum and Minimum
Welding.	The Use of Will, Can and May
Steam Boilers.	Prevention, Protection, etc., Classification
Steam Locomotives.	The Impersonal Passive
Condensation and Condensers.	Passive Verb + By + Noun (agent)
Centrifugal Governors.	Too Much or Too Little
Impulse Turbines.	Instructions (Imperative)
The Petro Engine.	Requirements and Necessity
The Carburation System.	Means (by + Noun or –ing)
The Jet Engine.	Time Statements
The Turbo-Prop Engine.	Function, Duty
Aerofoil.	Alternatives

Assessment method:

Exam : 100%.

References:

1. J. Upjohn, S. Blattes, V. Jans, Minimum Competence in Scientific English, Office des Publications Universitaires, 1994.
2. A.J. Herbert, The Structure of Technical English, Longman, 1972.
3. S. Berland-Delepine, Grammaire méthodique de l'anglais moderne avec exercices, Ophrys, 1982.
4. Test of English as a Foreign Language – Preparation Guide, Cliffs, 1991.
5. R. Fowler, The Little, Brown Handbook, Little, Brown Company, 1980.
6. Cambridge – First Certificate in English, Cambridge books, 2008.

7. K. Wilson, Th. Healy, First Choice, Oxford, 2007.
8. M. Mann, S. Tayore-Knowles, Destination : Grammar & Vocabulary with Answer Key, MacMillan, 2006.
9. E. Hamby, Ph. Bedford Robinson, Special English Computer Applications, Cassell, 1980.
10. P. Charles Brown, Norma D. Mullen, English for Computer Science, Oxford University Press, 1989.
11. Graeme Kennedy, Structure and Meaning in English: A Guide for Teachers, Pearson, 2004.
12. Anne M. Hanson, Brain-Friendly Strategies for Developing Student Writing Skills, 2nd Edition, Corwin Press, 2008.
13. Ann Bridges, How to Pass Higher English, Hodder Gibson-Hachette, 2009.
14. Claude Renucci, Anglais : 1000 Mots et expressions de la presse : Vocabulaire et expressions du monde économique, social et politique, Fernand Nathan, 2006.

Semester: 2
Teaching unit: UEF1.2
Subject 1 : Mathematics 2
VHS: 67h30 (Course: 3h00, TD: 1h30)
Credits: 6
Coefficient: 3

Teaching objectives

Students are led, step by step, towards understanding mathematics useful for their university studies. At the end of the course, the student should be able to: solve first and second degree differential equations; solve integrals of rational, exponential, trigonometric and polynomial functions; solve systems of linear equations using several methods.

Recommended prior knowledge

Basic concepts of mathematics (differential equation, integrals, systems of equations, etc.)

Course Content:

Chapter 1: Matrices and Determinants (3 Weeks)
1-1 Matrices (Definition, operation). 1-2 Matrix associated with a linear application. 1-3 Linear application associated with a matrix. 1-4 Change of basis, passage matrix.
Chapter 2: Systems of Linear Equations (2 Weeks)
2-1 Generalities. 2-2 Study of the solution set. 2-3 Methods for solving a linear system. Resolution by the Cramer method. Resolution by the inverse matrix method. Resolution by the Gauss method.
Chapter 3: Integrals (4 Weeks)
3-1Indefinite integral, property.3-2Integration of rational functions.3-3Integration of exponential and trigonometric functions.3-4The integral of polynomials.3-5Defined integration
Chapter 4: Differential Equations (4 Weeks)
4-1 Ordinary differential equations. 4-2 First-order differential equations. 4-3 Second-order differential equations. 4-4 Second-order ordinary differential equations with constant coefficient.
Chapter 5: Functions of Several Variables (2 Weeks)
5-1 Limit, continuity and partial derivatives of a function. 5-2 Differentiability. 5-3 Double and triple integrals.

Assessment method:

Continuous assessment: 40%; Exam: 60%.

Bibliography:

1. F. Ayres Jr, Théorie et Applications du Calcul Différentiel et Intégral - 1175 exercices corrigés, McGraw-Hill.
2. F. Ayres Jr, Théorie et Applications des équations différentielles - 560 exercices corrigés, McGraw-Hill.
3. J. Lelong-Ferrand, J.M. Arnaudiès, Cours de Mathématiques - Equations différentielles, Intégrales multiples, Tome 4, Dunod Université.
4. M. Krasnov, Recueil de problèmes sur les équations différentielles ordinaires, Edition de Moscou
5. N. Piskounov, Calcul différentiel et intégral, Tome 1, Edition de Moscou
6. J. Quinet, Cours élémentaire de mathématiques supérieures 3- Calcul intégral et séries, Dunod.
7. J. Quinet, Cours élémentaire de mathématiques supérieures 4- Equations différentielles, Dunod.
8. J. Quinet, Cours élémentaire de mathématiques supérieures 2- Fonctions usuelles, Dunod.
9. J. Quinet, Cours élémentaire de mathématiques supérieures 1- Algèbre, Dunod.
10. J. Rivaud, Algèbre : Classes préparatoires et Université Tome 1, Exercices avec solutions, Vuibert.
11. N. Faddeev, I. Sominski, Recueil d'exercices d'algèbre supérieure, Edition de Moscou.

Semester: 2
Teaching unit: UEF1.2
Subject 2 : Physics 2
VHS: 67h30 (Course: 3h00, TD: 1h30)
Credits: 6
Coefficient: 3

Teaching objectives

To introduce the student to the physical phenomena underlying the laws of electricity in general.

Recommended prior knowledge

Mathematics 1, Physics 1.

Course Content:

Mathematical reminders: (1 Week)
1- Elements of length, surface, volume in Cartesian, cylindrical, spherical coordinate systems. Solid angle, Operators (gradient, rotational, Nabla, Laplacian and divergence).
2- Multiple derivatives and integrals.
Chapter I. Electrostatics: (6 Weeks)
1- Electrostatic charges and fields. Electrostatic interaction force-Coulomb's law.
2- Electrostatic potential. 3- Electric dipole. 4- Electric field flux. 5- Gauss's theorem. 6- Conductors in equilibrium. 7- Electrostatic pressure. 8- Capacitance of a conductor and a capacitor.
Chapter II. Electrokinetics: (4 Weeks)
1- Electrical conductor. 2- Ohm's law. 3- Joule's law. 4- Electrical circuits. 5- Application of Ohm's law to networks. 6- Kirchhoff's laws. Thevenin's theorem.
Chapter III. Electromagnetism: (4 Weeks)
1- Magnetic field: Definition of a magnetic field, Biot and Savart's Law, Ampere's Theorem, Calculation of magnetic fields created by permanent currents.
2- Induction phenomena: Induction phenomena (circuit in a variable magnetic field and mobile circuit in a magnetic fieldpermanent), FLorentz force,FLaplace force, Faraday's law,
Lenz's law, Application to coupled circuits.

Assessment method:

Continuous assessment: 40%; Exam: 60%.

Bibliography:

1. J.-P. Perez, R. Carles, R. Fleckinger ; Électromagnétisme Fondements et Applications, Ed. Dunod, 2011.
2. H. Djelouah ; Électromagnétisme ; Office des Publications Universitaires, 2011.
3. P. Fishbane et al. ; Physics For Scientists and Engineers with Modern Physics, 3rd ed. ; 2005.
4. P. A. Tipler, G. Mosca ; Physics For Scientists and Engineers, 6th ed., W. H. Freeman Company, 2008.

Semester: 2
Teaching unit: UEF1.2
Subject 3 : Thermodynamics
VHS: 67h30 (Course: 3h00, TD: 1h30)
Credits: 6
Coefficient: 3

Teaching objectives

Provide the necessary foundations of classical thermodynamics for applications to combustion and thermal machines. Homogenize students' knowledge. The skills to be acquired are: The acquisition of a scientific basis of classical thermodynamics; The application of thermodynamics to various systems; The statement, explanation and understanding of the fundamental principles of thermodynamics.

Recommended prior knowledge

Basic mathematics.

Course Content:

Chapter 1: Generalities on thermodynamics (3 Weeks)
1-Fundamental properties of state functions. 2- Definitions of thermodynamic systems and the external environment. 3- Description of a thermodynamic system. 4- Evolution and thermodynamic equilibrium states of a system. 5- Possible transfers between the system and the external environment. 6- Transformations of the state of a system (operation, evolution). 7- Reminders of the laws of ideal gases.
Chapter 2: The 1st principle of thermodynamics: (3 weeks)
1. Work, heat, internal energy, concept of conservation of energy. 2. The first principle of thermodynamics: statement, concept of internal energy of a system, application to ideal gas, enthalpy function, heat capacity, reversible transformations (isochoric, isobaric, isothermal, adiabatic).
Chapter 3: Applications of the first principle of thermodynamics to thermochemistry (3 weeks)
Heats of reaction, standard state, standard enthalpy of formation, enthalpy of dissociation, enthalpy of change of physical state, enthalpy of a chemical reaction, Hess's law, Kirchoff's law.
Chapter 4: The 2nd principle of thermodynamics (3 weeks)
1- The 2nd principle for a closed system. 2. Statement of the 2nd principle: Entropy of a closed isolated system. 3. Calculation of the variation of entropy: reversible isothermal transformation, reversible isochoric transformation, reversible isobaric transformation, adiabatic transformation, during a change of state, during a chemical reaction.
Chapter 5: The 3rd Principle and absolute entropy **(1 week)**
Chapter 6: Free energy and enthalpy – Criteria for the evolution of a system (2 weeks)
1- Introduction. 2- Free energy and enthalpy. 3- Chemical equilibria.

Assessment method:

Continuous assessment: 40%; Exam: 60%.

Bibliography:

1. C. Coulon, S. Le Boiteux S. et P. Segonds, Thermodynamique Physique - Cours et exercices avec solutions, Edition Dunod.
2. H.B. Callen, Thermodynamics, Cours, Edition John Wiley and Sons, 1960
3. R. Clerac, C. Coulon, P. Goyer, S. Le Boiteux & C. Rivenc, Thermodynamics, Cours et travaux dirigés de thermodynamique, Université Bordeaux 1, 2003
4. O. Perrot, Cours de Thermodynamique I.U.T. de Saint-Omer Dunkerque, 2011
5. C. L. Huillier, J. Rous, Introduction à la thermodynamique, Edition Dunod.

Semester: 2
Teaching unit: UEM1.2
Subject 1 : Physics 2 laboratory Work
VHS: 45h00 (TP: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

Consolidate through practical work sessions the theoretical concepts covered in the Physics 2 course.

Recommended prior knowledge

Mathematics 1, Physics 1.

Course Content:

5 manipulations minimum (3h00 / 15 days)

- Presentation of measuring instruments and tools (Voltmeter, Ammeter, Rheostat, Oscilloscopes, Generator, etc.).

- Kirchhoff's laws (mesh law, knot law).

- Thévenin's theorem.

- Association and Measurement of inductances and capacities.

- Charging and discharging a capacitor.

- Oscilloscope.

- Practical work on magnetism.

Assessment method:

Continuous assessment: 100%.

Semester: 2
Teaching unit: UEM1.2
Subject 2 : Chemistry 2 (Practical Work)
VHS: 22h30 (TP: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

Consolidate the theoretical concepts covered in the Thermodynamics course through practical work sessions.

Recommended prior knowledge

Thermodynamics.

Course Content:

1. Ideal gas laws.

2. Water value of the calorimeter.

3. Specific heat: specific heat of liquid and solid bodies.

4. Latent heat: Latent heat of fusion of ice

5.Heat of reaction: Determination of the energy released by a chemical reaction (HCl/NaOH)

6. Hess's Law

7. Vapor pressure of a solution.

Assessment method:

Continuous assessment: 100%.

Semester: 2
Teaching unit: UEM1.2
Subject 3 : Computer Science 2
VHS: 45h00 (course: 1h30, Practical work: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

Master basic programming and algorithmic techniques. Acquire fundamental computer science concepts. The skills to be acquired are: Programming with a certain degree of autonomy; Designing algorithms from the simplest to the relatively complex.

Recommended prior knowledge

Know how to use the university website, file systems, Windows user interface, programming environment.

Course Content:

Chapter 1:Indexed variables (4Weeks)
1- One-dimensional arrays: Representation in memory, Operations on arrays 2- Two-dimensional arrays: Representation in memory, Operations on two-dimensional arrays
Chapter 2: Functions and Procedures (6 Weeks)
1- Functions: Types of functions, declaration of functions, function calls .
2- Procedures: Concepts of global variables and local variables, simple procedure, procedure with arguments
Chapter 3: Recordings and Files (5 Weeks)
1- Heterogeneous data structure
2- Structure of a record (notion of fields)
3- Manipulation of record structures
4- Concept of file
5- File access modes
6- Reading and writing to a file

Computer Science 2 (Practice):

Plan a certain number of practical exercises to put into practice the programming techniques seen during the course.

- Practical work of programming techniques seen in class.

Assessment method:

Continuous assessment: 40%; Exam: 60%.

Bibliography:

1. Les algorithmes pour les Nuls grand format Livre de John Paul Mueller (Informatiker, USA) et Luca Massaron 2017
2. Algorithmique: cours avec 957 exercices et 158 problèmes Livre de Charles E. Leiserson, Clifford Stein et Thomas H. Cormen 2017
3. Algorithmes: Notions de base Livre de Thomas H. Cormen 2013.

Semester: 2
Teaching unit: UEM1.2
Subject 4 : Presentation Methodology
VHS: 15h00 (Class: 1h00)
Credits: 1
Coefficient: 1

Teaching objectives

Provide the main bases for a successful oral presentation. Among the skills to acquire: Knowing how to prepare a presentation; Knowing how to present a presentation; Knowing how to capture the attention of the audience; Being aware of the pitfalls of plagiarism and knowing the regulations of intellectual property.

Recommended prior knowledge

Expression and communication techniques and writing methodology.

Course Content:

Chapter 1: The Oral Presentation (3 Weeks)
Communication. Preparing an oral presentation. Different types of plans.
Chapter 2: Presenting an Oral Presentation (3 Weeks)
Structure of an oral presentation. Presentation of an oral presentation.
Chapter 3: Plagiarism and Intellectual Property (3 Weeks)
1- Plagiarism: Definitions of plagiarism, punishment for plagiarism, how to borrow other authors' work, quotes, illustrations, how to be sure to avoid plagiarism?
2- Writing a bibliography: Definition, objectives, how to present a bibliography, writing the bibliography
Chapter 4: Presenting Written Work (6 Weeks)
- Present a written work. Applications: presentation of an oral presentation.

Assessment method:

Exam: 100%.

Bibliography

1. M. Fayet, Méthodes de communication écrite et orale, 3e édition, Dunod, 2008.
2. M. Kalika, Mémoire de master – Piloter un mémoire, Rédiger un rapport, Préparer une soutenance, Dunod, 2016.
3. M. Greuter, Réussir son mémoire et son rapport de stage, l'Etudiant, 2014
4. B. Grange, Réussir une présentation. Préparer des slides percutants et bien communiquer en public. Eyrolles, 2009.
5. H. Biju-Duval, C. Delhay, Tous orateurs, Eyrolles, 2011.
6. C. Eberhardt, Travaux pratiques avec PowerPoint. Créer et mettre en page des diapositives, Dunod, 2014.
7. F. Cartier, Communication écrite et orale, Edition GEP- Groupe Eyrolles, 2012.
8. L. Levasseur, 50 exercices pour prendre la parole en public, Eyrolles, 2009.
9. S. Goodlad, Speaking technically – A Handbook for Scientists, Engineers, and Physicians on How to Improve Technical Presentations, Imperial College Press, 2000.
10. M. Markel, Technical communication, eleventh edition, Bedford/St Martin's, 2015.

Semester: 2
Teaching unit: UED1.2
Subject 1: Careers in Science and Technology 2
VHS: 22h30 (Class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

To introduce the student, in a first step, to all the sectors covered by the Science and Technology Field and in a second step to a range of careers that these sectors lead to. In the same context, this subject introduces the student to the new challenges of sustainable development as well as the new careers that can result from it.

Recommended prior knowledge

None.

Course Content:

1.Industrial Hygiene and Safety (IHS) sectors and Gmining industry: (2 weeks)
- Definitions and areas of application (Safety of property and people, Environmental issues, Exploration and exploitation of mineral resources, etc.)
-Role of the specialist in these areas.
2.Climate Engineering and Transportation Engineering courses: **(2 weeks)**
- Definitions, areas of application (Air conditioning, Smart buildings, Safety in transport, traffic management and road, air, naval transport, etc.)
- Role of the specialist in these areas.
3.Civil Engineering, Hydraulics and Public Works sectors: **(2 weeks)**
- Definitions and areas of application (Construction materials, Major road and rail infrastructure, Bridges, Airports, Dams, Drinking water supply and sanitation, Hydraulic flows, Water resource management, Public works and land use planning, Smart cities, etc.)
- Role of the specialist in these areas.
4.Aeronautics, Mechanical Engineering, Maritime Engineering and Metallurgy: (2 weeks)
- Definitions and areas of application (Aeronautics, Avionics, Automotive Industry, Ports, Seawalls, Production of industrial equipment,Steel industry, Metal processing,…)
- Role of the specialist in these areas.
5. Approaches to sustainable production: (2 weeks)
Industrial ecology, remanufacturing, ecodesign.
6. Measure the sustainability of a process/product/service: (2 weeks)
Environmental analysis, Life cycle analysis (LCA), Carbon footprint, case studies/applications.
7. Sustainable Development and Business: (3weeks)
Definition of the company as an economic entity (notions of profit, costs, performance) and social entity (notion of corporate social responsibility), Impact of economic activities on the environment (examples), Challenges/benefits of sustainable development for the company, Means of engagement in a sustainable development approach (e.g. ISO 14001 certification, labeling (e.g. energy labeling, Ecolabel, Organic/AB Label, FSC Label, etc.), strategic sustainable development plan, Global Reporting Initiative (GRI)…), World rankings of the most sustainable companies (Dow Jones Sustainable Index, Global 100, etc.), Company case studies high-performance/eco-responsible in the ST sectors (e.g. SIEMENS, Cisco, Henkel AG & Co, TOTAL, Peugeot, Eni SPA ...).
Student's personal work for this subject:

- Work in groups/pairs: Reading articles on sustainable development and/or reports from successful and sustainable companies and preparing summaries of the main actions undertaken in the field of sustainable development.
Examples of documents for reading and summarizing:
- Case of ONA and ENIEM: Kadri, Mouloud, 2009, Sustainable development, business and ISO 14001 certification, Market and organizations vol. 1 (No. 8), p. 201-215 (free online access:http://www.cairn.info/revue-marche-et-organizations-2009-1-page-201.htm).

- Mireille Chiroleu-Assouline. Sustainable development strategies for businesses. Ideas, The Review of Economic and Social Sciences, CNDP, 2006, pp. 32-39 (free online access:http://halshs.archivesouvertes.fr/hal-00306217/document)
- Web page on environmental and societal commitments of TOTAL:https://www.total.com/fr/engagement
- Innovationssustainable mobilityfrom the PSA group:http://www.rapportannuel.groupepsa.com/rapport-2015/engagements/dessolutions-innovantes-pour-des-transports-durables/

Assessment method:

100% exam.

Bibliography:

1. V. Maymo et G. Murat, La boîte à outils du Développement durable et de la RSE- 53 outils et méthodes, Edition : Dunod, 2017.
2. P. Jacquemot et V. Bedin, Le dictionnaire encyclopédique du développement durable, Edition : Sciences Humaines, 2017.
3. Y. Veyret, J. Jalta et M. Hagnerelle, Développements durables : Tous les enjeux en 12 leçons, Edition : Autrement, 2010.
4. L. Grisel et Ph. Osset, L'Analyse du cycle de vie d'un produit ou d'un service: Applications et mise en pratique, 2eme Edition : AFNOR, 2008.
5. Sh. Shaked, N. Jolliet-Gavin, P. Crettaz, M. Saadé-Sbeih et O. Jolliet, Analyse du cycle de vie: Comprendre et réaliser un écobilan, 3eme Edition : PPUR, 2017.
6. G. Pitron et H. Védrine, La guerre des métaux rares : La face cachée de la transition énergétique et numérique, Edition : Liens qui libèrent, 2018.
7. Les métiers de l'environnement et du développement durable, Collection : Parcours, Edition : ONISEP, 2015.

Semester: 2
Teaching unit: UET1.2
Subject 1: French language 2
VHS: 22h30 (class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

This subject aims to develop the following four skills: Oral comprehension, Written comprehension, Oral expression and Written expression through reading and studying texts.

Recommended prior knowledge:

Basic French.

Course Content:

Below we offer a set of themes that cover fundamental sciences, technologies, economics, social issues, communication, sports, health, etc. The teacher can choose texts from this list to develop them during the course. Otherwise, they are free to address other themes of their choice. The texts can be borrowed from various communication media: daily newspapers, sports or entertainment magazines, specialized or popular magazines, books, websites, audio and video recordings, etc.

For each text, the teacher helps the student develop their linguistic skills: listening, comprehension, and oral and written expression. In addition, they must use this text to identify the grammatical structures they will develop during the same class session. Here, for illustration purposes, we recall a set of grammatical structures that can be developed as examples. Of course, it is not a question of developing them all or in the same way. Some can be recalled and others in great detail.

Examples of themes	Grammatical structures
The pharmaceutical industry The food industry The National Employment Agency ANEM Sustainable development Renewable energies Biotechnology Stem cells Road safety The dams Water – Water resources Avionics Automotive electronics Electronic newspapers Carbon 14 dating Violence in stadiums Drugs: a social scourge Smoking School failure The Algerian War Social networks Advertising Autism	The subjunctive. The conditional. The imperative. The past participle. The passive form. Possessive adjectives, possessive pronouns. Demonstratives, Demonstrative pronouns. The expression of quantity (several, a few, enough, many, more, less, as much, etc.). Numbers and measurements. The pronouns "who, that, where, whose". Subordinate preposition of time. The cause, The consequence. The goal, the opposition, the condition. Comparatives, superlatives. …

Assessment method:

Exam: 100%.

Bibliography:

1. M. Badefort, Objectif : Test de Français International, Edulang, 2006.
2. O. Bertrand, I. Schaffner, Réussir le TCF, Exercices et activités d'entrainement, Les éditions de l'école polytechnique, 2009.
3. M. Boulares, J.-L. Frerot, Grammaire progressive du Français avec 400 exercices, Niveau avancé, CLE International.
4. Collectif, Besherelles : la Grammaire pour tous, Hatier.
5. Collectif, Besherelles : la Conjugaison pour tous, Hatier.
6. M. Grégoire, Grammaire progressive du Français avec 400 exercices, Niveau débutant, CLE International, 1997.
7. A. Hasni et al., La formation à l'enseignement des sciences et des technologies au secondaire, Presses de l'université du Québec, 2006.
8. J.-L. Lebrun, Guide pratique de la rédaction scientifique, EDP Sciences, 2007.
9. J.M. Robert, Difficultés du Français, Hachette,
10. C. Tisset, Enseigner la langue française à l'école : La Grammaire, L'Orthographe et la Conjugaison, Hachette Education, 2005.
11. J. Bossé-Andrieu, Abrégé des Règles de Grammaire et d'Orthographe, Presses de l'université du Québec, 2001.
12. J.-P. Colin, Le français tout simplement, Eyrolles, 2010.
13. Collectif, Test d'évaluation de Français, Hachette, 2001.
14. Y. Delatour et al., Grammaire pratique du Français en 80 fiches avec exercices corrigees, Hachette, 2000.
15. Ch. Descotes et al., L'Exercisier : l'expression française pour le niveau intermédiaire, Presses Universitaires de Grenoble, 1993.
16. H. Jaraush, C. Tufts, Sur le Vif, Heinle Cengage Learning, 2011.
17. J. Dubois et al., Les indispensables – Orthographe, Larousse, 2009.

Semester: 2
Teaching unit: UET1.2
Subject 1: English Language 2
VHS: 22h30 (class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

Develop the reading, writing, listening and speaking abilities of the students.

Recommended prior knowledge:

Basic English.

Contents:

The English syllabus consists of a set of texts containing scientific and technical parts. The chosen texts must be used to study scientific and technical English and Grammar acquisition.

The texts must be selected according to the vocabulary built up, familiarization with both scientific and matters in English for further understanding. Therefore, each text will be defined by a set of

vocabulary concepts, a set of special sentences (idioms) and comprehension questions.

The texts must also contain a terminology which means the translation of some words from English to French one. , the activity at the end of each session must include a translation of long statements which are selected from the texts.

Examples for some lectures:	Examples of Word Study: Patterns
Radioactivity.	Explanation of Cause
Chain Reaction.	Result
Reactor Cooling System.	Conditions (if), Conditions (Restrictive)
Conductor and Conductivity.	Eventuality
Induction Motors.	Manner
Electrolysis.	When, Once, If, etc. + Past Participle
Liquid Flow and Metering.	It is + Adjective + to
Liquid Pumps.	As
Petroleum.	It is + Adjective or Verb + that…
Road Foundations.	Similarity, Difference
Rigid Pavements.	In Spite of, Although
Piles for Foundations.	Formation of Adjectives
Suspension Bridges.	Phrasal Verbs

References:

1. J. Upjohn, S. Blattes, V. Jans, Minimum Competence in Scientific English, Office des Publications Universitaires, 1994.
2. A.J. Herbert, The Structure of Technical English, Longman, 1972.
3. S. Berland-Delepine, Grammaire méthodique de l'anglais moderne avec exercices, Ophrys, 1982.
4. Test of English as a Foreign Language – Preparation Guide, Cliffs, 1991.
5. R. Fowler, The Little, Brown Handbook, Little, Brown Company, 1980.
6. Cambridge – First Certificate in English, Cambridge books, 2008.
7. K. Wilson, Th. Healy, First Choice, Oxford, 2007.
8. M. Mann, S. Tayore-Knowles, Destination : Grammar & Vocabulary with Answer Key, MacMillan, 2006.

9. E. Hamby, Ph. Bedford Robinson, Special English Computer Applications, Cassell, 1980.

10. P. Charles Brown, Norma D. Mullen, English for Computer Science, Oxford University Press, 1989.

11. Graeme Kennedy, Structure and Meaning in English: A Guide for Teachers, Pearson, 2004.

12. Anne M. Hanson, Brain-Friendly Strategies for Developing Student Writing Skills, 2nd Edition, Corwin Press, 2008.

13. Ann Bridges, How to Pass Higher English, Hodder Gibson-Hachette, 2009.

14. Claude Renucci, Anglais : 1000 Mots et expressions de la presse : Vocabulaire et expressions du monde économique, social et politique, Fernand Nathan, 2006.

Semester: 3
Teaching unit: UEF 2.1.1
Subject 1: Mathematics 3
VHS: 67h30 (class: 3h00, practical work: 1h30)
Credits: 6
Coefficient: 3

Teaching objectives

At the end of this course, the student should be able to know the different types of series and their conditions of convergence as well as the different types of convergence.

Recommended prior knowledge

Mathematics 1 and Mathematics 2.

Course Content:

Chapter 1: Simple and Multiple Integrals 3 weeks
1.1 Reminders on the Riemann integral and on the calculation of primitives. 1.2 Double and triple integrals.
1.3 Application to the calculation of areas, volumes, etc.
Chapter 2: Improper Integrals 2 weeks
2.1 Integrals of functions defined on an unbounded interval. 2.2 Integrals of functions defined on a bounded interval, infinite at one end.
Chapter 3: Differential Equations 2 weeks
3.1 Review of ordinary differential equations. 3.2 Partial differential equations. 3.3 Special functions.
Chapter 4: Series 3 weeks
4.1 Numerical series. 4.2 Sequences and series of functions. 4.3 Power series, Fourier series.
Chapter 5: Fourier Transform 3weeks
5.1 Definition and properties. 5.2 Application to the resolution of differential equations.
Chapter 6: Laplace Transform 2weeks
6.1 Definition and properties. 6.2 Application to the resolution of differential equations.

Assessment method:

Continuous assessment: 40%; Final exam: 60%.

Bibliography:

1. F. Ayres Jr, Théorie et Applications du Calcul Différentiel et Intégral - 1175 exercices corrigés, McGraw-Hill.
2. F. Ayres Jr, Théorie et Applications des équations différentielles - 560 exercices corrigés, McGraw-Hill.
3. J. Lelong-Ferrand, J.M. Arnaudiès, Cours de Mathématiques - Equations différentielles, Intégrales multiples, Tome 4, Dunod Université.
4. M. Krasnov, Recueil de problèmes sur les équations différentielles ordinaires, Edition de Moscou
5. N. Piskounov, Calcul différentiel et intégral, Tome 1, Edition de Moscou
6. J. Quinet, Cours élémentaire de mathématiques supérieures 3- Calcul intégral et séries, Dunod.
7. J. Quinet, Cours élémentaire de mathématiques supérieures 4- Equations différentielles, Dunod.
8. M. R. Spiegel, Transformées de Laplace, Cours et problèmes, 450 Exercices corrigés, McGraw-Hill.

Semester: 3
Teaching unit: UEF 2.1.1
Subject 1: Waves and Vibrations
VHS: 45h00 (class: 3h00, practical work: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

Introduce the student to the phenomena of mechanical vibrations restricted to low amplitude oscillations for 1 or 2 degrees of freedom as well as to the study of the propagation of mechanical waves.

Recommended prior knowledge

Mathematics 2, Physics 1 and Physics 2

Course Content:

Part A: Vibrations

Chapter 1: Introduction to Lagrange's equations 2 weeks
1.1 Lagrange equations for a particle
1.1.1 Lagrange equations
1.1.2 Case of conservative systems
1.1.3 Case of velocity-dependent friction forces
1.1.4 Case of a time-dependent external force
1.2 Multi-degree-of-freedom system.
Chapter 2: Free Oscillations of Systems at a Degree offreedom 2 weeks
2.1 Undamped Oscillations
2.2 Free oscillations of damped systems
Chapter 3: Forced Oscillations of One-Degree-of-Freedom Systems 1 week
3.1 Differential equation
3.2 Mass-spring-damper system
3.3 Solution of the differential equation
3.3.1 Harmonic excitation
3.3.2 Periodic excitation
3.4 Mechanical impedance
Chapter 4: Free oscillations of two-degree-of-freedom systems 1 week
4.1 Introduction
4.2 Two-degree-of-freedom systems
Chapter 5: Forced Oscillations of Two-Degree-of-Freedom Systems 2 weeks
5.1 Lagrange equations
5.2 Mass-spring-shock absorber system
5.3 Impedance
5.4 Applications
5.5 Generalization to systems with n degrees of freedom

Part B: Waves

Chapter 1: One-dimensional propagation phenomena 2 weeks
1.1 Generalities and basic definitions
1.2 Propagation equation
1.3 Solution of the propagation equation
1.4 Progressive sinusoidal wave
1.5 Superposition of two progressive sinusoidal waves
Chapter 2: Vibrating Strings 2 weeks
2.1 Wave equation
2.2 Harmonic Progressive Waves

2.3 Free oscillations of a string of finite length
2.4 Reflection and transmission
Chapter 3: Acoustic Waves in Fluids 1 week
3.1 Wave equation
3.2 Speed of sound
3.3 Progressive sinusoidal wave
3.4 Reflection-Transmission
Chapter 4: Electromagnetic Waves 2 weeks
4.1 Wave equation
4.2 Reflection-Transmission
4.3 Different types of electromagnetic waves

Assessment method:

Continuous assessment: 40%; Final exam: 60%.

Bibliography:

1. H. Djelouah ; Vibrations et Ondes Mécaniques – Cours & Exercices (site de l'université de l'USTHB : perso.usthb.dz/~hdjelouah/Coursvom.html)
2. T. Becherrawy ; Vibrations, ondes et optique ; Hermes science Lavoisier, 2010
3. J. Brac ; Propagation d'ondes acoustiques et élastiques ; Hermès science Publ. Lavoisier, 2003.
4. R. Lefort ; Ondes et Vibrations ; Dunod, 2017
5. J. Bruneaux ; Vibrations, ondes ; Ellipses, 2008.
6. J.-P. Perez, R. Carles, R. Fleckinger ; Electromagnétisme Fondements et Applications, Ed. Dunod, 2011.
7. H. Djelouah ; Electromagnétisme ; Office des Publications Universitaires, 2011.

Semester: 3
Teaching unit: UEF 2.1.2
Subject 1 Fluid mechanics
VHS: 45h00 (class: 1h30, practical work: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

To introduce the student to the field of fluid mechanics, fluid statics will be detailed in the first part. Then in the second part the study of the movement of inviscid fluids will be considered at the end it is the movement of the real fluid that will be studied.

Recommended prior knowledge:

Course Content:

Chapter 1: Properties of Fluids 3 weeks
1. Physical definition of a fluid: States of matter, divided matter (dispersion, suspensions, UEMlsions)
2. Perfect fluid, real fluid, compressible fluid and incompressible fluid.
3. Density, volumetric mass
4. Rheology of a fluid, Viscosity of fluids, surface tension of a fluid

Chapter 2: Fluid Statics 4 weeks
1. Definition of pressure, pressure at a point in a fluid
2. Fundamental law of fluid statics
3. Level surface
4. Pascal's Theorem
5. Calculation of pressure forces: Flat plate (horizontal, vertical, oblique), center of thrust, static pressure measuring instruments, pressure measurement atmospheric, barometer, Torricelli's law
6. Pressure for superimposed immiscible fluids

Chapter 3 Dynamics of perfect incompressible fluids 4 weeks
1. Permanent flow
2. Continuity equation
3. Mass flow rate and volume flow rate
4. Bernoulli's theorem, cases without labor exchange and with labor exchange
5. Applications to flow and speed measurements: Venturi, Diaphragms, tubes of Pitot…
6. Euler's Theorem

Chapter 4: Dynamics of real incompressible fluids 4 weeks
1. Flow regimes, Reynolds experiment
2. Dimensional analysis, Vashy-Buckingham theorem, Reynolds number
3. Linear pressure losses and singular pressure losses, Moody diagram.
4. Generalization of Bernoulli's theorem to real fluids

Assessment method:

Continuous assessment: 40%; Final exam: 60%.

Bibliography:

1- R. Comolet, 'Mécanique des fluides expérimentale', Tome 1, 2 et 3, Ed. Masson et Cie.
2- R. Ouziaux, 'Mécanique des fluides appliquée', Ed. Dunod, 1978
3- B. R. Munson, D. F. Young, T. H. Okiishi, 'Fundamentals of fluid mechanics', Wiley & sons.
4- R. V. Gilles, 'Mécanique des fluides et hydraulique : Cours et problèmes', Série Schaum, Mc Graw Hill, 1975.
5- C. T. Crow, D. F. Elger, J. A. Roberson, ' Engineering fluid mechanics', Wiley & sons
6- R. W. Fox, A. T. Mc Donald, 'Introduction to fluid mechanics', fluid mechanics'
7- V. L. Streeter, B. E. Wylie, 'Fluid mechanics', McGraw Hill
8- F. M. White, ''Fluid mechanics', McGraw Hill
S. Amiroudine, J. L. Battaglia, 'Mécanique des fluides Cours et exercices corrigés', Ed. Dunod.

Semester: 3
Teaching unit: UEF 2.1.2
Subject 1 Rational mechanics
VHS: 45h00 (class: 1h30, practical work: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

The student will be able to grasp the nature of a problem (static, kinematic or dynamic) in solid mechanics; he will have the tools allowing him to solve the problem within the framework of classical mechanics. This subject constitutes a prerequisite for the subjects: RDM and analytical mechanics.

Recommended prior knowledge

The student must first master the physics subject 1, which deals with point mechanics. Also, the mathematics subject 2 includes essential tools.

Course Content:

Chapter 1: Mathematical reminders (elements of vector calculation). 1 week
Chapter 2: Generalities and Basic Definitions 2 weeks
2.1 Definition and physical meaning of force
2.2 Mathematical representation of force
2.3 Operations on force (composition, decomposition, projection)
2.4 Type of force: point, linear, surface, volume
2.5 Classification of forces: internal forces, external forces.
2.6 Mechanical models: the material point, the solid body
Chapter 3: Static. 3 weeks
3.1 Axioms of statics
3.2 Connections, supports and reactions
3.3 Axiom of Bonds
3.4 Equilibrium conditions:
3.4.1 Concurrent forces
3.4.2 Parallel forces
3.4.3 Plane forces
Chapter 4: kinematics of the rigid solid. 3 weeks
4.1 Brief reminders on the kinematic quantities for a material point.
4.2 Solid Body Kinematics
4.2.1 Translational movement
4.2.2 Rotational movement around a fixed axis
4.2.3 Plane movement
4.2.4 Compound movement.
Chapter 5: Mass Geometry. 3 weeks
5.1 Mass of a material system5.1.1 Continuous system
5.1.2. Discrete system
5.2 Integral formulation of the center of mass
5.2.1. Definitions (linear, surface and volume cases)
5.2.2 Discrete formulation of the center of mass
5.2.3 GULDIN's Theorems
5.3. Moment and product of inertia of solids
5.4. Inertia tensor of a solid
5.4.1 Special cases
5.42 Principal Axes of Inertia
5.5. Huyghens' Theorem
5.6. Moment of inertia of solids with respect to any axis.

Chapter 6: Dynamics of the rigid solid. 3 weeks
6.1 Brief reminders on dynamic quantities for a material point.
6.2 Rigid body kinetics element:
6.2.1 Quantity of movement
6.2.2 Angular momentum
6.2.3 Kinetic energy
6.3 Equation of dynamics for a solid body
6.4 Angular Momentum Theorem
6.5 Kinetic Energy Theorem
6.6 Applications:
6.6.1 Pure translation case
6.6.2 Case of rotation around a fixed axis
6.6.3 Combined case of translation and rotation.

Assessment method:

Continuous assessment: 40%; final exam: 60%.

Bibliography:

1. Éléments de Mécanique rationnelle. S. Targ. Editions Mir Moscou
2. Mécanique à l'usage des ingénieurs. STATIQUE. Edition Russell. Ferdinand P. Beer
3. Mécanique générale. Cours et exercices corrigés. Sylvie Pommier. Yves Berthaud. DUNOD.
4. Mécanique générale - Théorie et application, Editions série. MURAY R. SPIEGEL schaum, 367p.
5. Mécanique générale – Exercices et problèmes résolus avec rappels de cours, Office des publications Universitaires, Tahar HANI 1983, 386p.

Semester: 3
Teaching unit: UEM 2.1
Subject 1: Probabilities & Statistics
VHS: 45h00 (class: 1h30, practical work: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

Module allows students to see the essential notions of probability and statistics, namely: statistical series with one and two variables, probability on a finite universe and random variables.

Recommended prior knowledge

Mathematics 1 and Mathematics 2

Course Content:

Part A: Statistics

Chapter 1: Basic Definitions (1 week)
A.1.1 Concepts of population, sample, variables, modalities
A.1.2 Different types of statistical variables: qualitative, quantitative, discrete, continuous.
Chapter 2: Single-variable statistical series (3 weeks)
A.2.1 Number, Frequency, Percentage.
A.2.2 Cumulative workforce, Cumulative frequency.
A.2.3 Graphical representations: bar chart, pie chart, stick chart. Polygon of frequencies (andfrequencies). Histogram. Cumulative curves.
A.2.4 Position characteristics
A.2.5 Dispersion characteristics: range, variance and standard deviation, coefficient of variation.
A.2.6 Shape characteristics.
Chapter 3: Two-variable statistical series (3 weeks)
A.3.1 Data tables (contingency table). Scatter plot.
A.3.2 Marginal and conditional distributions. Covariance.
A.3.3 Linear correlation coefficient. Regression line and Mayer line.
A.3.4 Regression curves, regression corridor and correlation ratio.
A.3.5 Functional adjustment.
Part B: Probabilities
Chapter 1: Combinatorial Analysis (1 Week)
B.1.1Arrangements
B.1.2Combinations
B.1.3Permutations.
Chapter 2: Introduction to Probability (2 weeks)
B.2.1Algebra of events
B.2.2Definitions
B.2.3Probability spaces
B.2.4General probability theorems
Chapter 3: Conditioning and Independence (1 week)
B.3.1Packaging,
B.3.2Independence,
B.3.3Bayes' formula.

Chapter 4: Random Variables 1 Week
B.4.1Definitions and properties,
B.4.2Distribution function,
B.4.3Mathematical expectation,
B.4.4Covariance and moments.

Chapter 5: Common Discrete and Continuous Probability Laws 3 Weeks
Bernoulli, binomial, Poisson, ...; Uniform, normal, exponential, ...

Assessment method:

Continuous assessment: 40%; Final exam: 60%.

Bibliography:

1. D. Dacunha-Castelle and M. Duflo. Probabilités et statistiques : Problèmes à temps fixe. Masson, 1982.
2. J.-F. Delmas. Introduction au calcul des probabilités et à la statistique. Polycopié ENSTA, 2008.
3. W. Feller. an Introduction to Probability Theory and its Applications, Volume 1. Wiley & Sons, Inc., 3rd edition, 1968.
4. G. Grimmett, D. Stirzaker, Probability and Random Processes, Oxford University Press, 2nd edition, 1992.
5. J. Jacod and P. Protter, Probability Essentials, Springer, 2000.
6. A. Montfort. Cours de statistique mathématique. Economica, 1988.
7. A. Montfort. Introduction à la statistique. École Polytechnique, 1991

Semester: 3
Teaching unit: UEM 2.1
Subject 2: Computer Science 3
VHS: 22h30 (practical work: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

Teach the student programming using easy-to-access software (mainly: Matlab, Scilab, Mapple, etc.). This subject will be a tool for carrying out practical work on numerical methods in S4.

Recommended prior knowledge

The basics of programming acquired in computer science 1 and 2

Course Content:

TP 1: Presentation of a scientific programming environment (Matlab, Scilab, etc.) 1 week
TP 2: Script files and Data and variable types 2 weeks
TP 3: Reading, displaying and saving data 2 weeks
TP 4: Vectors and matrices 2 weeks
TP 5: Control instructions (for and while loops, if and switch instructions) 2 weeks
TP 6: Function files 2 weeks
TP 7: Graphics (Management of graphic windows, plot 2 weeks
TP 8: Using toolbox 2 weeks

Assessment method:

Continuous assessment: 100%.

Bibliography:

1. ébuter en algorithmique avec MATLAB et SCILAB / Jean-Pierre Grenier, . - Paris : Ellipses,2007 . - 160 p.
2. Scilab de la théorie à la pratique / Laurent Berger, . - Paris : D. Booker, 2014.
3. Programmation et simulation en Scilab / Bégyn Arnaud, Gras Hervé, Grenier Jean-Pierre, - Paris : Ellipses,2014 . - 160 p.
4. Informatique : programmation et calcul scientifique en Python et Scilab classes préparatoires scientifiques 1er et 2e années / Thierry Audibert, ; Amar Oussalah ; Maurice Nivat, . - Paris : Ellipses, 2010 . - 520 p

Semester: 3
Teaching unit: UEM 2.1
Subject 3: Technical drawing
VHS: 22h30 (practical work: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

This course will allow students to acquire the principles of representing parts in industrial design. Furthermore, this subject will allow the student to represent and read plans.

Recommended prior knowledge

(brief description of the knowledge required to follow this course – Maximum 2 lines).

In order to follow this course, basic knowledge of the general principles of drawing is required.

Course Content

Chapter 1: General Information. 2 weeks
1.1 Usefulness technical drawings and different types of drawings.
1.2 Drawing materials.
1.3 Standardization (Types of lines, Writing, Scale, Drawing format and folding, Cartridge, etc.).
Chapter 2: Elements of Descriptive Geometry 6 Weeks
2.1 Concepts of descriptive geometry.
2.2 Orthogonal projections of a point - Drawing of a point - Orthogonal projections of a straight line (any and particular) - Drawing of a straight line - Traces of a straight line- Projections of a plane (Any and particular positions) - Traces of a plane.
2.3 Views: Choice and arrangement of views – Dimensioning – Slope and taper – Determination of the 3rd view from two given views.
2.4 Method of executing a drawing (layout, 45° line, etc.)
Application exercises and assessment (TP)
Chapter 3: Perspectives 2 weeks
Different types of perspectives (definition and purpose).
Application exercises and assessment (TP).
Chapter 4: Cuts and Sections 2 weeks
4.1 Sections, rules of standardized representations (hatching).
4.2 Projections and sections of simple solids (Projections and sections of a cylinder, of a prism, pyramid, cone, sphere, etc.).
4.3 Half-cut, Partial cuts, Broken cuts, Sections, etc.
4.4 Vocabularytechnical (terminology of machined shapes, profiles, piping, etc.
Application exercises and assessment (TP).

Chapter 5: Quotation 2 weeks
5.1 General principles.
5.2 Quotation, tolerance and adjustment.
Exercises applications and evaluation (TP).

Chapter 6: Concepts on definition and assembly drawings and nomenclatures. 1 Week

Application exercises and assessment (TP).

Assessment method:

Continuous assessment: 100%.

Bibliography:

1. Guide du dessinateur industriel Chevalier A. Edition Hachette Technique;
2. Le dessin technique 1er partie géométrie descriptive Felliachi d. et Bensaada s. Edition OPU Alger;
3. Le dessin technique 2er partie le dessin industriel Felliachi d. et bensaada s. Edition OPU Alger;
4. Premières notions de dessin technique Andre Ricordeau Edition Andre Casteilla;
5. المدخل إلى الرسم الصناعي ماجد عبد الحميد ديوان المطبوعات الجامعية الجزائر

مبادئ أساسية في الرسم الصناعي عمر أبو حنيك المعهد الجزائري للتقييس والملكية الصناعية طبع الحميد ديوان المطبوعات الجامعية الجزائر

Recommendation:

A large part of the practical work must be in the form of personal work at home.

Semester: 3
Teaching unit: UEM 2.1
Subject 4: Practical work on Waves and Vibrations
VHS: 15h00 (practical work: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

The objectives assigned by this program focus on introducing students to putting into practice the knowledge received on the phenomena of mechanical vibrations restricted to low amplitude oscillations for one or two degrees of freedom as well as the propagation of mechanical waves.

Recommended prior knowledge

Vibrations and waves, Mathematics 2, Physics 1, Physics 2.

Course Content:

TP.1Mass – spring
TP.2 Simple pendulum
TP.3 Torsion pendulum
TP.4 Oscillating electric circuit in free and forced mode
TP.5 Coupled pendulums
TP.6 Transverse oscillations in vibrating strings
TP.7 Grooved pulley according to Hoffmann
TP.8 Electromechanical systems (The electrodynamic loUEDpeaker)
TP.9 The Pohl pendulum
TP.10 Propagation of longitudinal waves in a fluid.

Noticed: It is recommended to choose at least 5 TP from the 10 offered.

Assessment method:

Continuous assessment: 100%.

Bibliography

(Depending on the availability of documentation at the establishment level, websites, etc.)

Semester: 3
Teaching unit: UED 2.1
Subject 1: Basic technology
VHS: 22h30 (Class: 1.5 hours)
Credits: 1
Coefficient: 1

Teaching objectives

This course will enable students to acquire knowledge about the processes for obtaining and manufacturing parts and the techniques for assembling them.

Recommended prior knowledge

Course Content

Chapter 1: Materials 3 Weeks
1.1Metals and alloys and their designations
1.2 Plastics (polymers)
1.3 Composite materials
1.4 Others materials
Chapter 2: Processes for obtaining parts without removing material4 Weeks
2.1 Casting, Forging, stamping, rolling, wire drawing, extrusion…. Etc.
2.2 Cutting, bending and stamping, etc.
2.3 Sintering and powder metallurgy
2.4 Profiles and Pipes (steel, aluminum);
- Workshop visits.
Chapter 3: Processes for obtaining parts by material removal 4 Weeks
Turning, milling, drilling; adjustment, etc.
- Workshop visits and demonstrations.
Chapter 4: Assembly Techniques 4 Weeks
- Bolting, riveting, welding, etc.

Assessment method:

Final exam: 100%.

Bibliography:

1. Manuel de technologie mécanique, Guillaume SABATIER, et al Ed. Dunod.
2. MemoTech : productique matériaux et usinage BARLIER C. Ed. Casteilla
3. Sciences industrielles MILLET N. ed. Casteilla
4. MemoTech : Technologies industrielles BAUR D. et al , Ed. Casteilla
5. Métrologie dimensionnelle CHEVALIER A. Ed. Delagrave
6. Perçage, fraisage JOLYS R et LABELL R. Ed. Delagrave
7. Guide des fabrications mécaniques PADELLA P. Ed. Dunod
8. Technologie : première partie, Ben Saada S et FELIACHI d. Ed. OPU Alger
9. تكنولوجيا عمليات التصنيع خرير ز و فواز د. ديوان المطبوعات الجامعية الجزائر.

Semester: 3
Teaching unit: UED 2.1
Subject 2: Metrology
VHS: 22h30 (Class: 1.5 hours)
Credits: 1
Coefficient: 1

Teaching objectives

Teach the student the precision criteria for manufacturing and assembling parts; Know and be able to choose, in different cases, the methods and means of controlling and measuring the dimensions and manufacturing defects of mechanical parts.

Recommended prior knowledge

Trigonometry, optics and others.

Course Content

Chapter 1: General information on metrology 2 weeks
1.1 Definition of the different types of metrology (Scientific, so-called laboratory, legal, industrial);
1.2 Metrological vocabulary, definition;
1.3 National and international metrology institutions.
Chapter 2: The International System of Measurement SI 3 Weeks
2.1 Basic quantities and their units of measurement;
2.2 Additional sizes;
2.3 Derived quantities.
Chapter 3: Metrological characteristics of measuring devices 6 Weeks
3.1 Error and uncertainty (Accuracy, precision, fidelity, repeatability, reproducibility of a measuring device
3.2 Classification of measurement errors
3.2.1Gross value;
3.2.2 Systematic error;
3.2.3 Corrected gross value.
3.3 Accidental errors
3.3.1Random errors;
3.3.2 parasitic errors;
3.3.3 Estimated systematic errors.
3.4 Confidence interval;
3.5 Technical uncertainty;
3.6 Total measurement uncertainty;
3.7 Complete measurement result;
3.8 Identification and interpretation of the specifications of a definition drawing for the control;
3.9 Basics of calibers, gauges and simple measuring instruments.
Chapter 4: Measurement and Control 4 Weeks
4.1 Direct measurement of lengths and angles (use of ruler, caliper, of the micrometer and the protractor);
4.2 Indirect measurement (use of comparator, standard gauges);
4.3 Dimension control (use of buffers, jaws, etc.);
4.4 Measuring and control machines used in mechanical workshops (use ofnpneumatic comparator, profile projector and roughness meter.

Assessment method:

Final exam: 100%.

Bibliography:

(Depending on the availability of documentation at the establishment level, websites, etc.)

10. Manuel de technologie mécanique, Guillaume SABATIER, et al Ed. Dunod.

11. MemoTech : productique matériaux et usinage BARLIER C. Ed. Casteilla

12. Sciences industrielles MILLET N. ed. Casteilla

13. MemoTech : Technologies industrielles BAUR D. et al , Ed. Casteilla

14. Métrologie dimensionnelle CHEVALIER A. Ed. Delagrave

15. Perçage, fraisage JOLYS R et LABELL R. Ed. Delagrave

16. Guide des fabrications mécaniques PADELLA P. Ed. Dunod

17. Technologie : première partie, Ben Saada S et FELIACHI d. Ed. OPU Alger

18. تكنولوجيا عمليات التصنيع خرير ز و فواز د. ديوان المطبوعات الجامعية الجزائر.

Semester: 3
Teaching unit: UED 2.1
Subject 2: Metrology
VHS: 22h30 (Class: 1.5 hours)
Credits: 1
Coefficient: 1

Teaching objectives

This course should enable the student to have a language level where he will be able to use a scientific document and speak about his specialty and field in English at least with ease and clarity.

Recommended prior knowledge

English 1 and English 2

Course Content

- Oral comprehension and expression, vocabulary acquisition, grammar, etc.
-nouns and adjectives, comparatives, following and giving instructions, identifying things.
-Use of numbers, symbols, equations.
- Measurements: Length, surface, volume, power, etc.
- Describe scientific experiments.
- Characteristics of scientific texts.

Assessment method:

Final exam: 100%.

Bibliography:

(Depending on the availability of documentation at the establishment level, websites, etc.).

Semester: 4
Teaching unit: UEF 2.1
Subject 1: soil Mechanics
VHS: 45h00 (Course: 1h30,TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

The student will be able to characterize the physical parameters of the soil, to classify from identification tests in the laboratory and in-situ and become familiar with the water flow in the soil.

Prerequisites: recommended:

Core subjects Semesters 1 and 2

Course Content:

Chapter 1. Introduction to soil mechanics (2 weeks)

Object of the soil mechanics (History and application domain), the Definitions of the soil, the Origin and formation of soils, soil Structure (Soil of wheat and soils purposes).

Chapter 2. Identification and classification of soils (4 weeks)

Physical characteristics, particle size Analysis, Consistency of the soils purposes (Limits of Atterberg), Classification of soils.

Chapter 3. Soil compaction (4 weeks)

Theory of compaction, compaction Testing in the laboratory (Test Proctor normal and modified), Materials and special processes of compaction in-situ, Prescriptions and compaction control.

Chapter 4 : The water in the soil (5 weeks)

Water flow in the soil : speed, gradient, flow, Darcy's law, permeability,
Measurement of permeability in the laboratory and in-situ, Principle of effective stress,
Study of the networks of the flow.

Method of assessment:

Continuous Control: 40%; Examination: 60%.

Bibliography

1. COSTET J. et SANGLERAT G, "Cours pratique de mécanique des sols", Tome 1, Dunod, 1981.
2. SANGLERAT G., CAMBOU B., OLIVARI G. "Problèmes pratiques de Mécanique des sols, Tome 1, Dunod, 1983.
3. AMAR S. et MAGNAN J.P. "Essais de mécanique des sols en laboratoire et en place,", publié par LCPC, 1980.
4. SCHLOSSER F. "Éléments de mécanique des sols, 2e Ed., Presses de l'E.N.P.C.", 1997.

Semester: 4
Teaching unit: UEF 2.1
Subject 2: Materials of construction
VHS: 22h00 (Course: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

The student will be able to characterize the physico-mechanical construction materials.

Prerequisites: recommended :

All of the core subjects of the common base S1 and S2.

Course Content :

Chapter 1 : General information (2 weeks)

History of construction materials, Classification of materials of construction, Properties of building materials.

Chapter 2 : The aggregates (4 weeks)

Granularity Classification of the aggregates, properties of the aggregates, Different types of aggregates.

Chapter 3 : The binders (6 weeks)

Classification, binders air (lime), The hydraulic binders (cement portland), the main Constituents and additions

Chapter 4 : mortars (3 weeks)

Composition, different types of mortars (lime mortar, cement mortar), main Characteristics.

Mode of assessment :

Exam : 100%.

Bibliography

1. Matériaux Volume 1, Propriétés, applications et conception : cours et exercices : Licence 3, master, écoles d'ingénieurs, Edition Dunod, 2013.
2. Adjuvants du béton, Afnor, 2012.
3. Granulats, sols, ciments et bétons : caractérisation des matériaux de génie civil par les essais de laboratoire : terminale STI génie civil, BTS bâtiment, BTS travaux publics, DUT génie civil, master pro géosciences génie civil, écoles d'ingénieurs, Casteilla, 2009.
4. Les propriétés physico-chimiques des matériaux de construction : matière & matériaux, propriétés rhéologiques & mécaniques, sécurité & réglementation, comportement thermique, hygroscopique, acoustique et optique, Eyrolles, 2012.

Semester : 4
Teaching unit: UEF 2.2.2
Subject 1 : Mathematics 4
VHS: 45h00 (Course: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

This course focuses on the differential and integral calculus of complex functions of a complex variable. The student must mastering the various techniques of resolution des functions and integrals to the variables complexs and special.

Prerequisites: recommende :

Math 1, Math 2 and Math 3.

Course Content:

Functions of complex variables and Special Functions

Chapter 1 : Functions holomorphes. Conditions of Cauchy Riemann 3 weeks

Chapter 2 : whole Series in 3 weeks

Radius of convergence. Domain of convergence. Development in the entire series. Analytic Functions. Series of Laurent and development of a series of Laurent

Chapter 3 : Theory of Cauchy 3 weeks

Theorem of Cauchy ; Formulas of Cauchy. Singular Point-of-functions method, general method of calculation of integrals of complex

Chapter 4 : Applications 4 weeks

Equivalence between holomorphie and Analytic. Theorem of the Maximum. Theorem of Liouville. Theorem of Rouché. Residue theorem. Calculation of integrals by the method of Residues.

Chapter 5 : Functions in Special 2 weeks

Special functions of Euler : Gamma functions, Beta, applications to the calculations of integrals

Method of assessment:

Continuous control : 40%; Examination: 60%.

Bibliography

1. Henri Catan, Théorie élémentaire des fonctions analytiques d'une ou plusieurs variables complexes. Editeur Hermann, Paris 1985.
2. Jean Kuntzmann, Variable complexe. Hermann, Paris, 1967.Manuel de premier cycle.
3. Herbert Robbins Richard Courant. What is Mathematics ?, Oxford University Press, Toronto,1978. Ouvrage classique de vulgarisation.
4. Walter Rudin, Analyse réelle et complexe. Masson, Paris, 1975. Manuel de deuxième cycle.

Semester : 4
Teaching unit: UEF 2.2.2
Material 2 : numerical Methods
VHS: 45h00 (Course: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

Familiarity with numerical methods and their applications in the field of mathematical calculations.

Prerequisites: recommended:

Mathematics 1, Mathematics 2, Informatique1 and computing 2

Course Content :

Chapter 1 : Solving non-linear equations f(x)=0 (3 weeks)
Introduction to calculation errors and approximations, Introduction to methods for solving non-linear equations, Method of bisection, Method of successive approximations (fixed point), Method of Newton-Raphson.

Chapter 2: polynomial Interpolation (2 weeks)
General Introduction, Polynomial of Lagrange Polynomials of Newton.

Chapter 3 : function Approximation : (2 weeks)
Approximation method and average quadratic, orthogonal Systems or pseudoOrthogonaux, Approximation by orthogonal polynomials, Approximation trigonometric.

Chapter 4 : numerical Integration (2 weeks)
General Introduction, Method, trapezoid Method of Simpson, Formulas quadrature.

Chapter 5 : Solving ordinary differential equations (problem of the initial condition). (2 weeks)
General Introduction, Method, Euler's Method Euler's improved Method of Runge-Kutta.

Chapter 6 : solving Method of direct linear systems of equations (2 weeks)
Introduction and definitions, Method of Gauss and pivotation, Method of factorization LU, Method of factorization of ChoeleskiMM^t, Algorithm of Thomas (TDMA) systems for sorting diagonals.

Chapter 7 : the Method of approximate resolution of systems of equations linear (2 weeks)
Introduction and definitions, Method, Jacobi Method, Gauss-Seidel, Use of relaxation.

Mode of assessment :

Continuous control : 40 % ; final Examination : 60 %.

Bibliography

1. C. Brezinski, Introduction à la pratique du calcul numérique, Dunod, Paris 1988.
2. G. Allaire et S.M. Kaber, Algèbre linéaire numérique, Ellipses, 2002.
3. G. Allaire et S.M. Kaber, Introduction à Scilab. Exercices pratiques corrigés d'algèbre linéaire, Ellipses, 2002.
4. G. Christol, A. Cot et C.-M. Marle, Calcul différentiel, Ellipses, 1996.
5. M. Crouzeix et A.-L. Mignot, Analyse numérique des équations différentielles, Masson, 1983.
6. S. Delabrière et M. Postel, Méthodes d'approximation. Équations différentielles. Applications Scilab, Ellipses, 2004.
7. J.-P. Demailly, Analyse numérique et équations différentielles. Presses Universitaires de Grenoble, 1996.
8. E. Hairer, S. P. Norsettet G. Wanner, Solving Ordinary Differential Equations, Springer, 1993.
9. P. G. Ciarlet, Introduction à l'analyse numérique matricielle et à l'optimisation, Masson, Paris, 1982.

Semester: 4
Teaching unit: UEF 2.2.3
Subject : Strength of materials
VHS: 45h00 (Course: 1: 30 pm, TD: 1 hour 30 minutes)
Credits: 4
Coefficient: 2

Teaching objectives

Learn the basic concepts of strength of materials, the goals and assumptions of the RDM, the concept of internal forces, geometric characteristics of the sections, the law of behavior of the materials, the concept of allowable stresses and design of the parts under stresses simple.

Prerequisites: recommended :

Rational mechanics and analysis functions.

Course Content :

Chapter 1. Introduction and overview (2 weeks)

Goals and assumptions of the strength of materials, Different types of loads, Links (supports, fixed supports, ball joints), General Principle of equilibrium-Equation of equilibrium, Method of sections-Concept of internal forces : normal load N, shear force T, bending Moment M, Definitions, conventions, symbols, and units.

Chapter 2. Geometric characteristics of the straight sections (2 weeks)

Center of gravity, Moments of static, Moments of inertia of a right section, Transformation of the moments of inertia. Axis main central moments of inertia principal.

Chapter 3. Simple tension and compression, simple (3 weeks)

Definitions, normal stresses of tension and compression, normal Stress, elastic Strain, the Law of Hooke, Young's Modulus, Diagram, stress-strain Condition of resistance and concept of permissible stress.

Chapter 4. Simple bending (4 weeks)

Definitions and assumptions, Effort, sharp, Moments flexing, Relationship differential between the load, shear force and bending Moment. Diagram of shear forces and moments, bending, Stresses in simple bending, the Notion of the neutral axis and sizing. Deformed shape of a beam subjected to simple bending (concept of the arrow), Calculation of the shear stress.

Chapter 5. Shear (2 weeks)

Definitions, Shear, simple Shear, pure shear Stress, elastic Strain in shear, the Condition of shear strength.

Chapter 6. Twist (2 weeks)

Definitions, shear Stress and slip, elastic Deformation in torsion, a Condition of resistance to torsion.

Method of assessment:

Continuous Control : 40%; Examination: 60%.

Bibliography

1. F. Beer, Mécanique à l'usage des ingénieurs – statique, McGraw-Hill, 1981.
2. G. Pissarenko et all, Aide-mémoire de résistance des matériaux.
3. Mirolioubov et coll, "Problèmes de résistance des matériaux", Editions de Moscou.
4. L. Aleinik& J. Durler, "Résistance des matériaux", Ed. Spes, Dunod.
5. M. Kerguignas&G. Caignaert, "Résistance des matériaux", Ed. Dunod Université.
6. P. Stepine, Résistance des matériaux, Editions MIR ; Moscou, 1986.
7. S. Timoshenko, Résistance des matériaux, Dunod, 1986.

8. William et Nash, Résistance des matériaux, cours et problème, série Schaum, 1983.

Semester: 4
Teaching unit: UEM 2.2
Subject 1: TP soil Mechanics
VHS: 22: 30 (TP: 1 hour 30 minutes)
Credits: 2
Coefficient: 1

Teaching objectives

The student will be able to characterize the physical parameters of the soil, to classify from identification tests in-situ and laboratory and to master their compaction.

Prerequisites: recommended :

The course of soil mechanics.

Course Content :

- Measurement of the characteristics weight (density – water content)
- Measurement of parameters of consistency limits (limits of Atterberg)
- Particle size analysis (sieve and sédimentométrie)
- Measurement of the characteristics of compaction and bearing capacity (test Proctor and CBR)
- Measurement of the density in-situ (testing the densitometer membrane)

Mode of assessment :

Continuous control : 100%.

Bibliography

1 Costet et Sanglerat,"Cours pratiques de mécanique des sols",Dunod – Paris.

2 Caquot et Kerisel,"Traité de mécanique des sols", Gauthier, Villars – Paris.

Semester : 4
Teaching unit : UEM 2.2
Subject 2 : structural Materials (laboratory work)
VHS : 22: 30 (TP : 1 h 30)
Credits: 2
Coefficient: 1

Teaching objectives

The student will be able to characterize the physico-mechanical construction materials.

Prerequisites: recommended :

Course of structural Materials.

Course Content :

TP1 : densities of cement, sand and gravel

TP2 : particle size Analysis of sand and gravel

TP3 : water Content and abundance of the sand

TP4 : Porosity of the sand and gravel

TP5 : Coefficient volumetric gravel

TP6 : Equivalent sand

TP7 : Test of consistency and setting of the cement

Mode of assessment :

Continuous control : 100%.

Semester: 4
Teaching unit: UEM 2.2
Subject 3: Computer Aided Design
VHS: 22: 30 (TP: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

This education will enable students to acquire the principles of representation of the parts in industrial design. More importantly, this will enable the student to represent and to read the plans.

Prerequisites recommended :

Technical Drawing..

Course Content:

1. **Presentation Of The Software Selected** **(4 weeks)**
(SolidWorks, Autocad, Catia, Inventor, etc)

1.1 Introduction and historical background of the DAO;
1.2 software Configuration chosen (gui, hotbar, options, etc);
1.3 reference Elements of the software (the aid of the software, tutorials, etc);
1.4 Backup files (part file, assembly file, drawing file, backup procedure for a discount to the teacher);
1.5 Communication and interdependence between files.

2. **Concept Sketches** **(3 weeks)**
2.1 The tools of sketches (point, line segment, arc, circle, ellipse, polygon, etc);
2.2 Relations sketches (horizontal, vertical, equal, parallel, hilly, fixed, etc);
2.3 Listing of sketches and constraints geometry.

3. Modelisation 3D **(3 weeks)**

3.1 Notions of planes (front plane, plan right, and top plan);
3.2 basic Functions (extrude, cut, revolve):
3.4 display Functions (zoom, multiple views, multiple windows etc):
3.5 editing tools (Erase, Move, Copy, Mirror, Adjust, Extend, Move):
3.6 Completion of a section view of the model.

4. Drawing from THE MODEL to 3D **(3 weeks)**

4.1 Edition of the plan and of the cartridge:
4.2 Choice of views, and implementation plan:
4.3 Rigs and Properties objects (hatch, dimension, text, tables, etc...

5. **Assemlages** **(2 weeks)**

5.1 assembly Constraints (parallel, coincidence, coaxial, fixed, etc):
5.2 Realization of assembly drawings:
5.3 switching assembly drawing and parts list:

Method of assessment:

Continuous control : 100%.

Bibliography

1. Solidworks bible 2013 Matt Lombard, Edition Wiley,
2. Dessin technique, Saint-Laurent, GIESECKE, Frederick E. Éditions du renouveau pédagogique Inc., 1982.
3. Exercices de dessins de pièces et d'assemblages mécaniques avec le logiciel SolidWorks, Jean-Louis Berthéol, François Mendes,

4. La CAO accessible à tous avec SolidWorks : de la création à la réalisation tome1 Pascal Rétif,
5. Guide du dessinateur industriel, Chevalier A, Edition Hachette Technique,

Semester : S4
Teaching unit: UEM 2.2
Subject 4 : Numerical Methods (practical work)
VHS: 22: 30 (TP : 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

Programming of the various numerical methods in view of their applications in the field of mathematical calculations by using a programming language of science.

Prerequisites: recommended:

Numerical method, Computer 2 and computer 3.

Course Content :

Chapter 1 : Solving nonlinear equations **(3 weeks)**
1.Method of bisection. 2. Method of fixed points, 3. Method of Newton-Raphson

Chapter 2 : Interpolation and approximation **(3 weeks)**
1.Interpolation of Newton, 2. Approximation Chebyshev

Chapter 3 : numerical Integrations **(3 weeks)**
1.Method of Rectangle, 2. Method of Trapezes, 3. Method of Simpson

Chapter 4 : differential Equations **(2 weeks)**
1.Method of Euler, 2. Methods of Runge-Kutta

Chapter 5 : Systems of linear equations **(4 weeks)**
1.Method of Gauss - Jordon, 2. Decomposition Crout and factorization LU, 3. Method of Jacobi, 4. Method of Gauss-Seidel

Mode of assessment :

Continuous control : 100 %.

Bibliography

1. Algorithmique et calcul numérique : travaux pratiques résolus et programmation avec les logiciels Scilab et Python / José Ouin, . - Paris : Ellipses, 2013 . - 189 p.
2. Mathématiques avec Scilab : guide de calcul programmation représentations graphiques ; conforme au nouveau programme MPSI / Bouchaib Radi, ; Abdelkhalak El Hami . - Paris : Ellipses, 2015 . - 180 p.
3. Méthodes numériques appliquées : pour le scientifique et l'ingénieur / Jean-Philippe Grivet, - Paris : EDP sciences, 2009 . - 371 p.

Semester: 4
Teaching unit: UEM 2.2
Subject 5: MDF and RDM (laboratory work)
VHS: 15h00 (TP:1h00)
Credits: 1
Coefficient: 1

Teaching objectives

Implement the various concepts studied in these materials, "Mechanics of fluids" taught in semester 3, and the subject " Strength of materials "of the semester.

Prerequisites: recommended :

Part I : fluid Mechanics
Part II : Strength of materials.

Course Content :

Part I : the practical Works : fluid Mechanics

TP N°1 : Measurement of the density and of the density of the liquid
TP N°2 : Measuring the viscosity of liquids
TP N°3 : pressure Measurement of liquids and calibration of a pressure gauge
TP N°4 : Measurement of force, hydrostatic and determination of the centre of buoyancy
TP N°5 : flow Measurement of liquids

Part II : practical Works : Strength of materials

TP N°1. Tensile tests and compression simple
TP N°2. Torsion test
TP N°3. Bending test simple
TP N°4. Essay resilience
TP N°5. Hardness test

Mode of assessment :

Continuous control : 100%.

Semester: 4
Teaching unit: UED2.2
Subject 1: Geology
VHS: 22h30 (class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

The student will be able to read and interpret a geologic map and understand better the problems of geotechnical engineering. Knowledge of the geophysical methods used.

Prerequisites: recommended:

Fundamental subjects of the S1, S2 and S3

Course Content:

Chapter 1 : Introduction to geology (2 weeks)
- 1.1 Definition of geology
- 1.2 Paleontology
- 1.3 Origin of the earth
- 1.4 Division of geology

Chapter 2 : minerals and rocks (4 weeks)
- 2.1 Concept of mineralogy
- 2.2 The rocks furniture
- 2.3-grained igneous rock
- 2.4 sedimentary rocks
- 2.5 The metamorphic rocks.

Chapter 3 : Action of the different elements on the rocks (3 weeks)
- 3.1 Action of the air on the rocks
- 3.2 The Action of water on the rocks
- 3.3 Action of the glaciers on the rocks

Chapter 4 : Concept of geodynamics (3 weeks)
- 4.1 Geodynamic internal (Earthquakes, volcanoes, ...)
- 4.2 Geodynamic external (Weathering, Erosion, Falling and Sliding, ...)

Chapter 5 : Adaptation of geological methods to the needs of civil engineering (3 wk)
- 5.1 The geological map
- 5.2 The use of graphical constructs
- 5.3 geological Survey of the surfaces of discontinuity
- 5.4 use of the stereographic projection

Mode of assessment :

Exam: 100%.

Bibliography

1. Hydrogéologie et notions de géologie d'ingénieur, G. BOGOMOLOV
2. Géologie : Bases pour l'ingénieur, Aurèle Parriaux et Marcel Arnould, 2009
3. Géologie de l'ingénieur : Engineering geology.. Bilingue français/anglais, Roger Cojean et Martine Audiguier, 2011
4. Hydrogéologie, géologie de l'ingénieur, Éditions du BRGM, 1984.
Faucault A.Raoult J-F (1995) – Dictionnaire de géologie, 4 édition. Editions Masson, 325p
5. Pomerol C., Lagabrielle Y., Renard M. (2005) – Eléments De Géologie, 13e édition. Editions Dunod, 762p.

Semester: 4
Teaching unit: UED 2.2
Subject 2: Topography 1
VHS: 22: 30 (class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

The student will be able to know the basics of the topography and allowing him to carry out and monitor the subsequent implantation of a building, leveling, angles and coordinates, plot plans, topographic

Prerequisites: recommended :

Mathematics ; Physics 1 ; technical Drawing

Course Content :

Chapter 1. General **(3 weeks)**
The topography in the act of building, The different measuring devices topographical scales (plans, maps), faults, and errors

Chapter 2. Distance measurement **(3 weeks)**
Direct measurement of distances, alignment Methods and details, Practice of measurement, Measures indirect distance

Chapter 3. Measurement of Angles **(3 weeks)**
Principle of operation of a theodolite, Set up a theodolite (Setting, Read, write), Read-angles, horizontal, Reading vertical angles.

Chapter 4. Determination of the surfaces **(3 weeks)**
Calculate the area of a polygon, Determination of the surfaces of the contours shown on the plan, Planimètre and to measure surfaces.

Chapter 5. Leveling direct and Indirect **(3 weeks)**
Leveling Direct, Leveling Indirect.

Mode of assessment :

Exam : 100%.

Bibliography

1. Antoine, P., Fabre, D., Topographie et topométrie modernes (Tome 1 et 2) – Serge Milles et Jean Lagofun, 1999.
2. Bouquillard , Cours De Topographie BepTech.geo T1, 2006
3. Dubois , F. et Dupont, G. (1998) précis de topographie, Principes et méthodes, Editions Eyrolles Paris
4. Herman, T. (1997a) Paramètres pour l'ellipsoïde. Edition Hermès, Paris
5. Herman, T. (1997b) Paramètres pour la sphère. Edition Dujardin, Toulouse
6. Meica (1997), Niveaux numériques, MiecaGeosystems, Paris
7. Tchin, M. (1976) Topographie appliquée, Cours à l'école Nationale Supérieure des Arts et Industries de Strasbourg, Spécialité Topographie.

Semester: S4
Teaching unit: UET 2.2
Subject 1: Techniques of Expression and Communication
VHS: 22h30 (class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

This education aims to develop the skills of the student, on the personal level or professional, in the field of communication and expression techniques.

Prerequisites: recommended:

Languages (Arabic ; French ; English)

Course Content :

Chapter 1: Search, analyze, and organize information (3 weeks)

Identify and use the site, tools and resources to Understand and analyze documents, create and update documentation.

Chapter 2: to Improve the capacity of expression (3 weeks)

Take into account the situation of Communication, to Produce a written message, Communicate by oral, Produce a message visually and audio-visual.

Chapter 3: to Improve the ability of communication in situations of interaction (3 weeks)

Analyze the process of Interpersonal communication, Improve the ability of communication in face-to-face, Improve the ability of group communication.

Chapter 4: to Develop independence, the ability of organization and communication in the framework of a project approach (6 weeks)

Be located in the project approach and communication, Anticipating the action, the implementation of a project : Presentation of a summary of a work practice (Duty home).

Mode of assessment :

Final exam : 100 %.

Bibliography

1. Jean-Denis Commeignes 12 méthodes de communications écrites et orale – 4éme édition, Michelle Fayet et Dunod 2013.
2. Denis Baril ; Sirey, Techniques de l'expression écrite et orale ; 2008. 3- Matthieu Dubost Améliorer son expression écrite et orale toutes les clés ; Edition Ellipses 2014.

Semester: 5
Teaching unit: UEF 3.1.1
Subject 1: Strength of materials 2
VHS: 45h00 (class: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

This material is a continuation of the Resistance of materials taught in the fourth semester, we will discuss the solicitations composed, the energy methods and indeterminate structures.

Prerequisites: recommended:

RDM 1, materials science, Mathematical.

Course Content :

Chapter 1 : the Bending of beams(2 weeks)

- Reminder bending moment – shear force.
- Normal stresses in simple bending
- shear stresses in Bending .

Chapter 2 : deflection of beams (2 weeks)

- Beam Deflection Equations (Double Integration Method).
- Method of initial parameters.
- Moment-Area Method
- superposition Method .

chapter 3 : energy methods and applications (3 weeks)

- Strain Energy Due to Axial Forces.
- Strain Energy Due to shear Forces.
- Strain Energy Due to Bending Moment
- Strain Energy Due to Twisting Moment.
- General Equation of Strain Energy.
- Castigliano's Theorem
- Fictitious load method.

Chapter 4 : combined stresses (3weeks)

- Biaxial bending.
- Axial- bending.
- bending - Twisting

Chapter 5 : **indeterminate structures (4 weeks)**

- introduction (systems of bars, joints, frames, portals, etc...)
- Method of initial parameters
- superposition Method.
- theorem of three moments.
- force-method.

Chapter 6 : Examples design -Applications (1 week)

Mode of evaluation :

Continuous Control : 40% ; Examination : 60 %.

Bibliography:

1. A. Giet ; L. Geminard. Résistance des matériaux, Editions Dunod 1986, Paris.
2. S. P. Timoshenko. Résistance des matériaux, Editions Dunod ; Paris.
3. M. Albiges, ; A Coin .Résistance des matériaux, Editions Eyrolles 1986 ; Paris.
4. Jean-Claude Doubrère. Résistance des matériaux, Editions Eyrolles 2013
5. YoudeXiong. Exercices résolus de résistance des matériaux, Editions Eyrolles, 2014.
6. Claude Chèze. Résistance des matériaux - Dimensionnement des structures, Sollicitations simples et composées, flambage, énergie interne, systèmes hyperstatiques, Ellipses, 2012.

Semester: 5
Teaching unit: UEF 3.1.1
Subject 2: reinforced Concrete 1
VHS: 45h00 (class: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

Teach the physical and mechanical characteristics of reinforced concrete. Learn the design of sections subjected to simple stresses (tension, compression and simple bending) according to Design Codes BAEL, CBA93.

Prerequisites: recommended:

Strength of materials 1, Materials of constructions.

Course Content:

Chapter 1. Formulation and mechanical properties of the reinforced-concrete (2 Weeks)

Definition and overview, Components of reinforced concrete, mechanical Properties.

Chapter 2. Regulatory requirements (3 Weeks)

Rule of cores, limits states, Combinations of actions, the Condition of non-fragility

Chapter 3. bond and splices (3 Weeks)

Bond Stresses, Anchoring a bar isolated right, Lengths for Tension Reinforcing

Chapter 4. Simple Compression (4 Weeks)

Strength limit resistance, Serviceability limit state.

Chapter 5. Simple tension (3 Weeks)

Strength limit resistance, Serviceability limit state.

Method of assessment:

Continuous Control: 40%; Examination: 60%.

Bibliography:

1. D.T.R-B.C.2-41, "Règles de conception et de calcul des structures en béton armé", (CBA 93).
2. Jean- Pierre Mouguin, "Cours de béton armé", B.A.E.L. 91", BERTI Edition.
3. Jean Perchat et Jean Roux, "Maitrise du B.A.E.L. 91 et des D.T.U associés", EYROLLES.
4. Jean Perchat et Jean Roux, "Pratique du B.A.E.L. 91 (Cours avec exercices corrigés)", EYROLLES.
5. Pierre Charon," Exercice de béton armé selon les règles B.A.E.L. 83", EYROLLES, 2ème édition.
6. Jean-Marie Paillé, " Calcul des structures en béton Guide d'application", Eyrolles, 2013.

Semester: 5
Teaching unit: UEF 3.1.1
Subject 3: steel Structures
VHS: 45h00 (Course: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

At the end of teaching this subject, the knowledge gained should enable the student to understand the bases for the calculation of the metallic elements and knowledge of the design codes (EC3 and CCM97) and have a general knowledge. the design philosophies of structural steel using limit state and connections.

Prerequisites: recommended:

Applied mathematics, mechanics, Structural materials 1.

Course Content :

Chapter 1. introduction **(1 Week)**
Steel in the construction, Material Steel, mechanical Properties of steels.

Chapter 2. Basic concepts and safety **(3 Weeks)**
Notions of security, characteristic Values of actions, technical Steps in the calculation (in CM), Regulation (CCM97 and Eurocode3), Principle of structural safety, forces and Combinations of actions (EC3 and CCM97).

Chapter 3. Connections **(4 Weeks)**
General information about the routes, Means of connections (bolting, welding), Aspects of the technology and Principle of operation.

Chapter 4. members in tension **(3 Weeks)**
Use of parts tense, embers Behavior, Calculation of gross section area, Verification to satisfy the ultimate Limit State, taking into account the effects of eccentric connections.

Chapter 5. members in tension **(4 Weeks)**
Use of members, resistance of cross-section, Introduction to the calculation of plastic sections, Resistance shear, Resistance bending with the ULS (forces calculation) and SLS (deflection calculations).

Mode of assessment :

Continuous control: 40 % ; Examination: 60 %.

Bibliography:

1. J. Morel, "Calcul des Structures Métalliques selon L'Eurocode 3".
2. "Règles de conception des structures en acier CCM97", édition CGS, Alger 1999, Eurocode 3 version, 2008
3. J. Brozzetti, M.A. Hirt, R. Bez, "Construction Métallique, Exemples Numériques adaptés aux Eurocodes", Presses Polytechniques et Universitaires Romandes.
4. S.P. Timoshenko, "Théorie de la Stabilité Élastique", Dunod.

Semester: 5
Teaching unit: UEF 3.1.2
Subject 1: soil Mechanics 2
VHS: 45h00 (Course: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

The objective of this course is to enable the student to supplement the knowledge acquired in the field of the mechanics of sols1 in S4. The student will receive instruction on the calculation of the stresses in the soil and the calculation of the compaction and consolidation of the soil. It will receive, the knowledge on the behaviour of soils under shear as well as on the methods for the recognition of soils.

Prerequisites: recommended:

Soil mechanics 1, Resistance matériaux1.

Course Content:

Chapter 1. Stresses and deformations (3 Weeks)

Introduction to the mechanics of continuous media, principal Stresses, stress Distribution as a function of the orientation of the facets around a point, a Circle of Mohr, Concept of effective stress (Principle of Terzaghi), Constraints géostatiques in a soil.

Chapter 2. Compaction and Consolidation of soils (5 Weeks)

Determination of the stresses due to an overload, Theory of Boussinesq (point Load and distributed), Amplitude of subsidence : Subsidence instant, compaction and primary packing, secondary Compressibility of soils : Characteristics of the curve of the compressibility, Determination of the curve of the compressibility from laboratory tests, Theory of One-Dimensional Consolidation.

Chapter 3. Shear strength of soils (4 Weeks)

Notions on the plasticity of soils, Curve, intrinsic, shear Test in laboratory: Casagrande's apparatus and triaxial test (Determination of the cohesion and the internal friction angle), drained and undrained conditions : distinction between Coarse and fine soils.

Chapter 4. Recognition and exploration of the soil (3 Weeks)

Importance of a campaign for recognition in a civil engineering project, general organizational Chart of a geotechnical study, Recognition geophysics; Recognition of geotechnical engineering., Tools and techniques of collection.

Method of assessment:

Continuous control: 40%; Examination: 60%.

Bibliography:

1. Costet J. Et Sanglerat G, "Cours pratique de mécanique des sols", Dunod, 1981.
2. AMAR S., MAGNAN J.P , « Essais de mécanique des sols en laboratoire et en place », Aide-mémoire, 1980,
3. FILLIAT G, "La pratique des sols et des fondations", Editions du Moniteur. 1981
4. SCHLOSSER F, « Éléments de mécanique des sols, Presses de l'Ecole Nationale des Ponts et Chaussées », 1988.
5. J. COLLAS et M. HAVARD, "Guide de géotechnique: Lexique et Essais", Editions Eyrolles, 1983.

Semester: 5
Teaching unit: UEF 3.1.2
Subject 2: Structural Materiels 2
VHS: 22h30 (Course: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

The goal is to allow the student to connect with the subject matter taught in S4, in particular on the components in concrete and their behaviours fresh (workability) and in the cured state (the mechanical resistance) without forgetting to describe the different types of concretes existing based on normative texts of today. Also, the student will know the development process of the different materials, from raw material to the finished product.

Prerequisites: recommended:

During the S4, the student will have acquired preliminary knowledge and base on the physical and mechanical characteristics of asphalt binders and aggregates. The student will be able to differentiate between the types of mortars.

Course Content:

Chapter 1. concrete **(7 Weeks)**
Definition and classification, physical Characteristics, and/or mechanical, Fly Ash, Admixtures, Formulation of concrete, Tests on fresh concrete, Tests on hardened concrete, the Concepts on the new concrete and their applications.

Chapter 2. Ceramic products **(4 Weeks)**
General, Classification of Ceramic products, raw materials, Manufacturing of ceramic products (Bricks, tiles, Tiles covering the walls and floors, Ceramic sanitary ware, etc).

Chapter 3. Metals **(2 Weeks)**
General Properties of metals (Physical, chemical, and mechanical), Classification of steels depending on the compositions, the Protection of ferrous metals against corrosion.

Chapter 4. Glass **(2 Weeks)**
Developing, manufacturing Process, Properties, and uses.

Mode of assessment :

Examination: 100%.

Bibliography:

1. Matériaux Volume 1, "Propriétés, applications et conception : cours et exercices : Licence 3, master, écoles d'ingénieurs", Edition, Dunod, 2013.
2. "Adjuvants du béton", Afnor, 2012.
3. "Granulats, sols, ciments et bétons: caractérisation des matériaux de génie civil par les essais de laboratoire : Ecoles d'ingénieurs", Castilla, 2009.
4. G. Dreux, "Le nouveau guide du béton". Editions Eyrolles.
5. "Ciments et bétons actuels", CIIC, Paris, 1987.

Semester: 5
Teaching unit: UEM 3.1
Subject 1: Topography
VHS: 22h30 (1h30 practice)
Credits: 2
Coefficient: 1

Teaching objectives

The themes addressed in the work practices will enable the student to put into practice the theoretical knowledge acquired during the course of Topography 1 and 2. The student will have the opportunity to perform all of the measurements, calculations and report known in the field of topography.

Prerequisites: recommended:

The knowledge acquired in the material Topography 1 and 2.

Course Content:

TP.1: Measurement of angles and distances
Angles: horizontal and vertical Distances: direct Method, indirect Method.

TP.2: Polygonation
Reconnaissance, Selection of stations, Sketches tracking, Measurements (Angles and distances), Calculations and report

TP.3: Tachymetry
Establishment of the sketches from the field, Survey details by radiation, Calculations and report

TP.4: leveling by the abscissa, and ordered and quasi-ordered
Choice of lines of operation, Measurements, Calculations and report

TP.5: Measures by oblique lateral
Establishment of the sketches from the field, Survey details by radiation, Calculations and report

TP.6: Implantation
Implementation of alignments: Calculations prior (Office), Implementation on the ground, Implementation of a bend, Calculations prior (Office), Implementation on the ground, Implementation of a building.

Method of assessment:

Continuous control: 100%

Bibliography:

1. L. Lapointe, G. Meyer, "Topographie appliquée aux travaux publics, bâtiment et levés urbains", Eyrolles, Paris, 1986.
2. R. D'Hollander, "Topographie générales, tome 1 et 2",Eyrolles, Paris, 1970.
3. M. Brabant, "Maîtriser la topographie", Eyrolles, Paris, 2003.

Semester: 5
Teaching unit: UEM 3.1
Subject 2: soils mechanics (laboratory work)
VHS: 22h30 (Course: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

The student will have the opportunity to conduct practical tests in the laboratory which are in relation with the knowledge acquired in the course of MDS2.

Prerequisites: recommended:

MDS1 and MDS2.

Course Content:

TP N. 1: Permeability of soils

Permeameters at constant load and variable load.

TP N. 2: Test of compressibility (oedometer)

TP-N. 3: direct shear test (casagrande box)

Method of assessment:

Continuous control: 100%.

Bibliography:

1. J. Collas and Mr. havard, "Guide of geotechnical engineering: Lexicon and Essays", Editions Eyrolles, 1983.

Semester: 5
Teaching unit: UEM 3.1
Subject 3: structural Materiels (laboratory work)
VHS: 22h30 (1h30)
Credits: 2
Coefficient: 1

Teaching objectives

These TPs have the main aim to develop in students the interest to know some specific properties of the materials in accordance with the standards in force and, especially, to get acquainted with a key material in the field of civil engineering : concrete. Put the student directly with the laboratory techniques.
The student has acquired the basic concepts in terms of TP on the materials, it is necessary to deepen his knowledge by testing more specific on the concrete.

Prerequisites: recommended:

Structural materials, Structural materials (laboratory work), strength of materiel 1.

Course Content :

TP. 1 : Determination of the modulus of smoothness and the rate of fine sand.

TP. 2 : Use of the method of Dreux-Gorisse for the determination of the composition of the concrete.

TP.3 : fabrication and testing of mortars.

TP.4 : Test of workability to the cone of Abrams.

TP.5 : Test crash on concrete.

TP.6 :non-destructive Tests.

Method of assessment:

Continuos control : 100%.

Bibliography:

G. Dreux, Le nouveau guide du béton, Editions Eyrolles.

F. Gorisse, Essais et contrôle des bétons, Editions Eyrolles.

Semester: 5
Teaching unit: UEM 3.1
Subject 4: Structural Drawings (practical work)
VHS: 37h30 (2h30)
Credits: 3
Coefficient: 2

Teaching objectives

The student must be able to :

- Optimize its "culture" (technological understanding and communication of the information by the graphic mode,),
- Know the current vocabulary and conventions of graphic representation,
- Take account of the link design / implementation (feasibility).

Prerequisites: recommended:

Technical Drawing

Course Content:

Chapter 1. Principles in the technical drawings (3 Weeks)

Convention of the technical drawing (Lines, Hatching, Scriptures, Formats, Cartridge), Presentation objects (Ladders, orthogonal Projections, Sections, sections, Dimensions, Perspectives).

Chapter 2. buildings Drawing (4 Weeks)

Terminology and consistency of architecture drawings, Scales, normal Name of the facades, Plans, Identification of the premises, Sections, Drawings of steel frames and reinforced concrete, Representation plan of the floors, and track their items, the Listing of the building, diagrammatic Representation and symbolic of windows, doors, and ducts in the walls, various Symbols, Layout and distribution of the figures.

Chapter 3. Rules and conventions specific to presentation drawings (5 Weeks)

Land-use planning and the recognition of the soil (Figuration conventional land-Legend lithological of the foundation soil, geological section, Records of surveys of recognition), masonry (Principle of representation of the various categories of masonry, reinforced Concrete and prestressed concrete (plans of formwork and reinforcement), of the metal Frame (the assembly Drawings, Assemblies)

Chapter 4. Design of drainage structures (3 Weeks)

The works of sanitation (network Plans, general rules for the presentation of networks).

Method of assessment:

Continuous control: 100%.

Bibliography:

1. G. Kienert et J. Pelletier, "Dessin technique de travaux publics et de bâtiment". Eyrolles.
2. Jean Pierre Gousset, "Techniques des dessins du bâtiment - Dessin technique et lecture de plan Principes et exercices", Editions Eyrolles, 2012.

Semester: 5
Teaching unit: UED 3.1
Subject 1: Topography 2
VHS: 22h30 (class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

At the end of this course, the student should be able to carry out and monitor a location of a work or parts of the book on the ground.

previous knowledge

The knowledge acquired in the field Topography 1 in semester 4.

Course Content:

Chapter 1. Polygonation **(3 Weeks)**

The different types of journey polygonal, Polygonal attached, Calculations polygonal Report

Chapter 2. Tachymetry **(4 Weeks)**

Definitions, use of the method tachéométrique, Preparation of the work: Its purpose, to the base Document; Recognition of places: Canvas, Sketches of the field; field Work: Composition of a brigade, The action on land; office Work: Calculations, Report

Chapter 3. Lifted by the abscissa, and ordered and quasi-ordered **(2 Weeks)**

Definitions, Method of survey, Calculations.

Chapter 4. Lifted oblique lateral **(2 Weeks)**

Definitions, Method of survey, Calculations.

Chapter 5. Implementation **(4 Weeks)**

Definitions, Implementation of alignments rights, the Establishment of curves (Connections circular), the Implantation of Buildings.

Method of assessment:

Exam : 100%.

Bibliography:

1. A.G.Heerbrugg, "Topographie et navigation, laica – wild GPS system", gosystms 1992
2. L. Lapointe, G. Meyer "Topographie appliquée aux travaux publics, bâtiment et levés urbains", Eyrolles, Paris, 1986.
3. R. D'hollander, "Topographie générales, tome 1 et 2",. Eyrolles, Paris, 1970.
4. M. Brabant, "Maîtriser la topographie",. Eyrolles, Paris, 2003.
5. S. Milles, J. Lagofun, "Topographie et topométrie modernes",. Eyrolles, Paris,1999.

Semester: 5
Teaching unit: UED 3.1
Subject 2: general Hydraulic
VHS: 22h30 (class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

Learn the fundamentals of hydraulics, the fundamental equations of the flow, the evaluation of the loss of load and the initiation to the calculations of the networks.

Previous knowledge

Fluid mechanics

Course Content:

Chapter 1. Hydrostatic **(2 weeks)**

- Characteristic and physical properties of liquids
- Concept of pressure
- Equation is fundamental to the hydrostatic
- Pressure at a point in a wall
- Forces of pressures on the walls

Chapter 2. Fundamental Equations of Hydrodynamic **(2 weeks)**

- streamlines, tube current.
- Equation of continuity
- Bernoulli's law
- Phenomenon of Venturi
- Pitot Tube.

Chapter 3. Dynamics of real liquids **(3 weeks)**

- fluids flow.
- Load losses.
- Theorem of Bernoulli generalized.
- Energy diagram.

Chapter 4. flow regimes in pipes, hydraulic resistances **(3 weeks)**

- Laminar and turbulent flows
- Reynolds number
- Calculation of pressure losses, application of the Equation of Manning

Chapter 5. Flow through the holes **(2 weeks)**

- Flow through Orifice
- Marketing support constant
- Marketing support variable

Chapter VI : Flow with a free surface and weirs **(3 weeks)**

- Classification of flows
- Geometric characteristics of the flow
- Discharge from the weir

Method of assessment:

Examination: 100%.

Bibliography:

1. "Mécanique des fluides et hydraulique (cours et problèmes)" série Schaum.
2. Armando Lencastre, "Hydraulique générale", Edition: Eyrolles.
3. Michel Carlier, "Hydraulique générale et appliquée", Edition: Eyrolles.

License Title: Civil Engineering

Semester: 5
Teaching unit: UET 3.1
Subject 2: Techniques and rules of construction
VHS: 22h30 (class: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

This material is composed of two parts. The first part aims to introduce students to the technical and technological aspects of the construction operation. The second part of the initiation of the students to the basic notions of the different regulations applied in the design of civil and industrial constructions with an application of the rules of justification of reinforced concrete structures according to the RPA.

Prerequisites: recommended:

The subjects taught in semester 4.

Course Content:

Chapter 1. Technical development of a project. (1 Week)

Process for the realization of a project construction, design and arrangements preparatory to the execution of the work, choosing a site and setting-out the works, geotechnical investigations.

Chapter 2. Techniques for the preparation of site (3 Weeks)

Preparation of the work and techniques of organization of the construction sites of building, picket and delimitation of the construction, earthworks and embankments, construction techniques for the removal of land, excavations, wells, shelling, recovery of topsoil, trenches and shielding, material cones

Chapter 3. Techniques of realization reinforced concrete structures (2 Weeks)

For the technical delivery of shallow foundations and deep foundations. Techniques of formwork and reinforcement of structures of buildings.

Chapter 4. Works in metal and mixed (2 Weeks)

Welding and bolting, Assembly of metal structures in the building and industrial halls.

Chapter 5. Introduction to the various regulations (2 Weeks)

Background and Need for the legislation, Introduction to the various building standards, standards BAEL and Eurocodes.

Chapter 6. The rules seismic RPA 99 version 2003 (1 Week)

(General rules of design seismic zones, criteria for the classification of books).

Chapter 7. Justification of reinforced concrete structures (2 Weeks)

(Combinations of actions, Justification vis-à-vis the resistance, the overall balance, and the stability of the foundations, the Definition and justification of the joints).

Chapter 8. Specification of the structure elements (2 Weeks)

Specifications for the main elements (columns, beams, floors, slabs, Walls, and curtains). Specifications for the secondary elements, which Specifications relating to materials.

Method of assessment:

Examination :100%.

Bibliography:

1. J. Mathivat et C. Boiteau, "Procédés généraux de construction Tome 1 : Coffrage et bétonnage", ENPC, Eyrolles.
2. J. Mathivat et Fenoux, "Procédés généraux de construction Tome 2 : Fondation et ouvrages d'art", ENPC, Eyrolles.
3. J. Mathivat et J. F. Bougard, "Procédés généraux de construction Tome 3 : Travaux Souterrains", ENPC, Eyrolles.
4. Règles parasismiques Algériennes RPA 99 version 2003. DTR –BC-2.48.

Semester: 6
Teaching unit: UEF 3.2.1
Subject 1: structural analysis
VHS: 45h00 (class: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

This course should allow students to deepen their knowledge in strength of materials and to acquire the methods of resolution of determinate and indeterminate structures.

Previous knowledge

Strength of materials 1, Strength of materials, 2.

Course Content :

Chapter 1. Analysis of Statically Determinate Trusses (4 Weeks)

introduction ; Determination of the member forces; Method of joints, Method of sections.

Chapter 2. Statically Determinate frames (2 Weeks)

introduction ; Determination of the member forces, internal forces diagrams (N, T, M)

Chapter 3 influence Lines (3 Weeks)

Definition and Principle of influence line, Principle of the moving load. Effect of a concentrated load and a uniform load; influence Line for : reactions, Shearing Force and Bending Moment.

Chapter 4. Statically indeterminate structures (6 Weeks)

Introduction, Degree of indeterminacy, force Method, Application to indeterminate frames.

Method of assessment:

Continuous assessment: 40%; Exam: 60%.

Bibliography:

1. F. Beer, Mécanique à l'usage des ingénieurs – statique, McGraw-Hill, 1981.
2. G. Pissarenko et all, Aide-mémoire de résistance des matériaux.
3. I. Mirolioubov et coll, "Problèmes de résistance des matériaux", Editions de Moscou.
4. L. Aleinik& J. Durler, "Résistance des matériaux", Ed. Spes, Dunod.
5. M. Kerguignas&G. Caignaert, "Résistance des matériaux", Ed. Dunod Université.
6. P. Stepine, Résistance des matériaux, Editions MIR ; Moscou, 1986.
7. S. Timoshenko, Résistance des matériaux, Dunod, 1986.
8. William et Nash, Résistance des matériaux, cours et problème, série Schaum, 1983.
9. R. Soltani, Lignes d'influence des poutres et des arcs isostatiques, O.P.U, 2003.

Semester: 6
Teaching unit: UEF 3.2.1
Subject 2: steel structures
VHS: 45h00 (class: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

At the end of teaching this subject, the knowledge gained in a metal frame (semester 5) must allow the student to complete his / her general knowledge on the phenomena of instabilities elastic profiles thin : aspects of theoretical and regulatory.

Previous knowledge

To follow this teaching, it is necessary to have followed the teachings of the material CM1 in S5 and have a basic knowledge on the theory of stability of elastic.

Course Content:

Chapter 1. Phenomena of instabilities elastic **(2 Weeks)**

Presentation of the instability, and different types of instability and regulations.

Chapter 2. members in compression simple **(5 Weeks)**

Use of struts, theory of buckling, buckling length, notions of slenderness and imperfection, verification documents compressed to the ELU.

Chapter 3. members in combined buckling **(6 Weeks)**

Theoretical Aspects and regulations of the combined buckling (EC3 and CCM97).

Chapter 4. members in torsinal buckling **(2 Weeks)**

Presentation of torsinal buckling, Moment of inertia of the torsion of open profiles, Reminders on the torsion with warping (non-uniform twisting).

Method of assessment:

Continuous assessment: 40%; Exam: 60%.

Bibliography:

1. Polycopié préparé par l'enseignant.
2. J. MOREL, "Calcul des Structures Métalliques selon l'EUROCODE 3".
3. P. BOURRIER; J. BROZZETTI, "Construction Métallique et Mixte Acier – Béton – Tomes 1 et 2", EYROLLES.
4. M.A. HIRT; R. BEZ, "Construction Métallique – Volumes 10 et 11" - Presses Polytechniques et Universitaires Romandes.
5. "Règles de conception des structures en acier", CCM97 édition CGS, Alger, 1999.
6. "Calcul pratique des structures métallique", Office des publications universitaires, Alger.
7. J. BROZZETTI; M.A. HIRT; R. BEZ, "Construction Métallique « Exemples Numériques adaptés aux Eurocodes", Presses Polytechniques et Universitaires Romandes.
8. S.P. TIMOSHENKO, "Théorie de la Stabilité Élastique", DUNOD.

Semester: 6
Teaching unit: UEF 3.2.2
Subject 1: reinforced Concrete 2
VHS: 67h30 (class: 3h00, TD: 1h30)
Credits: 6
Coefficient: 3

Teaching objectives

Teach the design of common sections (rectangular and T) under the action of simple stresses and combined with a support of the action of the shear force and torsion.

Previous knowledge

Résistance des matériaux, Matériaux de construction, Béton armé 1.

Course Content:

Chapter 1. Section subjected to a simple bending **(3 Weeks)**

Rectangular Section and T section :ultimate limit State of resistance + Serviceability limit states

Chapter 2. shear force **(3 Weeks)**

Calculation of transverse reinforcement, Audits in the areas of application of efforts concentrated, Verification of the resistance to punching, Audits in the areas of junction with the soul of the beams.

Chapter 3. Sections subjected to the composite bending **(7 Weeks)**

Calculation of sections limit states section or rectangular sections and Tee, Buckling of columns.

Chapter 4. Twist **(2 Weeks)**

General overview on the phenomenon of torsion and justification of the concrete and reinforcing steel (hollow sections and full).

Method of assessment:

Continuous assessment: 40%; Exam: 60%.

Bibliography:

1. D.T. R-B.C.2-41, "Règles de conception et de calcul des structures en béton armé".
2. Jean- Pierre Mouguin, "Cours de béton armé B.A.E.L. 91", Berti Edition.
3. Jean Perchat et Jean Roux, "Maitrise du B.A.E.L. 91 et des D.T.U associés", Eyrolles.
4. Jean Perchat et Jean Roux, "Pratique du B.A.E.L. 91 (Cours avec exercices corrigés)", Eyrolles
5. Pierre Charon, "Exercice de béton armé selon les règles B.A.E.L. 83", Eyrolles 2ème édition.

Semester: 6
Teaching unit: UEF 3.2.2
Subject 2: Foundations and geotechnical works
VHS: 45h00 (class: 1h30, TD: 1h30)
Credits: 4
Coefficient: 2

Teaching objectives

In this matter, the student will have the opportunity to gain knowledge on the foundations and structures in geotechnical engineering. It will be able to calculate and verify the stability of certain books, such as : retaining structures, foundations, and slopes.

Prerequisites: recommended:

The knowledge acquired in the materials MDS1, MDS2, RDM1, RDM2, BA1.

Course Content:

Chapter 1. limit States equilibrium Serviceability limit state design (3 Weeks)

Balances limits the upper and lower Rankine (passive and active earth pressure coefficients), Balance of Boussinesq (general case), Balance of Prandtl (Surge due to overload). Determination of the plans of rupture using the circle of Mohr in the case of thrust and stop.

Chapter 2. Retaining structures (4 Weeks)

Definition and classification of retaining structures; Shares land: flare-ups and stops ; Stability of retaining walls.

Chapter 3. Shallow foundations (4 Weeks)

Definition and classification of foundations, Theory of bearing capacity calculation of shallow foundations.

Chapter 4. Slope stability analysis (4 Weeks)

Introduction and general concepts, methods of slope stability calculation (factor of safety Concepts).

Method of assessment:

Continuous assessment: 100%.

Bibliography:

1. . J. Costet ; G. Sanglerat, "Cours pratique de Mécanique des sols", Tome 2, Dunod,1981.
2. G. Sanglerat; B. Cambou, G. Olivari, "Problèmes pratiques de Mécanique des sols, Tome 2, Dunod, 1983.
3. G. Phillipponat, B. Hubert "Fondations et ouvrages en terre", Edition Eyrolles, 1997
4. F. Schlosser, "Elément de Mécanique des sols",2e Ed., Presses des Ponts, 1997
5. F. Schlosser, "Exercices de Mécanique des sols", 2e Ed., Presses des Ponts, 1989
7. Schlosser F., 1988, "Éléments de mécanique des sols", Presses de l'Ecole Nationale des Ponts et Chaussées.

Semester: 6
Teaching unit: UEM 3.2
Subject 1: Project End-of-Cycle
VHS: 45h00 (TP: 3h00)
Credits: 4
Coefficient: 2

Teaching objectives

They contribute to the assimilation of knowknowledge provided by the program. They are more particularly devoted to the practical implementation of concepts. They tend to encourage the openingre students ' intellectual. They develop a special manner the sense of initiative and autonomy in the pursuit of a job, while leaving some points very open:
The project can be individual or collective,

Prerequisites: recommended:

RDM, BA, MDS, MDC, Drawing, Building, CAD, Foundation and geotechnical works

Course Content:

- Presentation and description of the project
- Presentation of the different calculation steps of a project
- Calculation assumptions
- Materials used
- Standards and regulations used
- The choice of the carrier system
- Pre-dimensioning of the elements of structures and valuation costs
- Calculation of reinforcement of floors (hollow floors, slabs)
- Calculation of secondary elements (a balcony, acroterion)
- Calculation and reinforcement of the stairs
- Calculation and reinforcement of a porch
- Foundation system.
- Production plans (Plan of formwork, reinforcement drawing ....) for calculated items.
- Conclusions and outlook

Method of assessment:

Continuous control: 100%.

Bibliography:

1. A. Guerrin , R.C. Lauvaur, "Traité du béton armé Tome 1-3-4-11", Edition Dunod.
2. Jean- Pierre Mouguin, "Cours de béton armé B.A.E.L. 91", BERTI Edition.
3. Jean Perchat et Jean Roux, "Maitrise du B.A.E.L. 91 et des D.T.U associés", EYROLLES.
4. Jean Perchat et Jean Roux, "Pratique du B.A.E.L. 91 (Cours avec exercices corrigés)", EYROLLES.

Semester: 6
Teaching unit: UEM 3.2
Subject 2: Computer-Aided Design
VHS: 37h30 (TP: 2h30)
Credits: 3
Coefficient: 2

Teaching objectives

Familiarise the students with the software of computing in civil engineering. The student must know the essential features of software for the calculation, based on an existing project, and must be able to master the software's interface and enter the correct data and retrieve the results.

Prerequisites: recommended:

Computer 1 and 2 and computer 3 .

Course Content:

Chapter 1. Concept based on the calculation software (3 Weeks)

Mode of operation and methods of calculation used, the closed source software, open-source software, advantages and limitations of the software.

Chapter 2. Getting started with software available. (6 Weeks)

Presentation of the interface, the work environment, data, options, results (graphical and numerical), interpretation.

Chapter 3. Study and follow-up of a real project : (6 Weeks)

Project of the end of the cycle, preferably

Method of assessment:

Continuous control: 100%.

Bibliography:

1. Manuel d'utilisation du logiciel hôte.

Semester: 6
Teaching unit: UEM 3.2
Subject 3: Quantities and Cost Estimation
VHS: 22h30 (course: 1h30)
Credits: 2
Coefficient: 1

Teaching objectives

The objective of this teaching unit is to equip the student with the knowledge of the basic tools for the establishment of a quantity surveying and specifications as well as knowledge of various acts of measurement.

Prerequisites:

This unit of teaching requires the necessary prerequisites such as Design, CONSTRUCTION, and DAO.

Course Content:

Chapter 1. General concepts (1 Week)

Definition and Estimation review and approval, the role of the quantity surveyor in the construction of the necessity and degree of precision of the evaluation of the works, Cost estimation documents.

Chapter 2. The acts of the quantity surveying (2 Weeks)

Summary estimates, quote, attachments, situations, jobs, accounts and memories.

Chapter 3. Mode of measurement and quantity surveying (2 Weeks)

Drafting and presentation of the before measurement, order of the before measurement; Reminders of formulas usual: measurement of areas and volumes (planes, polyhedra, etc), measurement of volumes classic – method of three levels, the formula for Simpson, and Poncelet.

Chapter 4. Application of the prior measurement of earthworks and excavation (2 Weeks)

Before measurement of the excavations for foundations, the quantities of earthwork calculation.

Chapter 5. Before measurement of masonry (2 Weeks)

Rubble stone masonry, brick masonry or agglomerated.

Chapter 6. Before measurement of the reinforced concrete (3 Weeks)

Concrete, shuttering, reinforcement.

Chapter 7. Price survey methodology (3 Weeks)

Definition and purpose, sub-retail prices, methods of calculation, pattern, and presenting the under-the retail price.

Method of assessment:

Exam : 100%.

Bibliography:

1. Michel Manteau,"Métré de Bâtiment", 7e Edition, Eyrolles, 1990.
2. Jena-Pierre Gousset, Jean-Claude Capdebielle, René Pralat, "Le Métré, CAO-DAO avec Autocad-Etude de prix", Editions Eyrolles, 2011.

Semester: 6
Teaching unit: UED 3.2
Subject 1: Roads and various networks
VHS: 22h30 (course: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

The student will learn in the material, it all works and infrastructure works related to the construction and development of roads and traffic on the outskirts of construction: roads, sidewalks, bike paths, green spaces, public lighting, urban furniture, etc

Prerequisites: recommended:

Knowledge of construction materials, soil mechanics, technical drawing and reading plan

Course Content:

Chapter 1. road works **(3 Weeks)**

The definition, classification, characteristics of the road; the route of The tracks, the composition of the pavement (the different layers of the road); parking areas (sidewalks, pedestrian lanes, thees curbs, and Inclusion of persons with disabilities; lanes gear aid, pathways-gear, routes-scales

Chapter 2. Sanitation **(5 Weeks)**

The drainage and sewerage networks-definition, principles and provisions, The water to be evacuated, the amount and quality of stormwater runoff, domestic sewage, industrial discharges.

desin of pipes, composition of drainage networks (the collectors and piping, manholes, chimneys visit, connections), the works of rainwater collection and stormwater runoff, the books appendices.

Chapter 3. The various networks **(5 Weeks)**

The piped networks (water needs, distribution systems (type and materials), the connections, the service and reserves the fire, electrical power distribution system; gas distribution system; telecommunication network.

Chapter 4. green spaces **(2 Weeks)**

The design of green spaces, green spaces components, green spaces management.

Method of assessment:

Exam : 100%.

Bibliography:

1. R. Bayon, "Voiries et réseaux divers", Eyrolles.
2. La pratique des VRD. Le moniteur.

Semester: 6
Teaching unit: UED 3.2
Subject 2: sites Organization
VHS: 22h30 (course: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

Acquire the theoretical and practical knowledge needed to deal with the problems of organization and planning of work in the construction.

Prerequisites:

The knowledge acquired in the field general Processes of construction.

Course Content:

Chapter 1. Site Installation **(1 Week)**

Installation and preparation of construction sites, the Peculiarities of the construction sites.

Chapter 2. Site equipment **(1 Week)**

The equipment and its use, Choice of equipment, Calculation of the yields of the equipment, Maintenance of the hardware.

Chapter 3. Work planning **(3 Weeks)**

Definition of the time unit of the hands of the works, Performance of equipment, and the Relationship between the " YOU " of MB and Performance of materials, Determination of the time unit of the hands of work and yields, Calculation of the total time estimate for the MB and Equipment.

Chapter 4. Planning and scheduling **(3 Weeks)**

Generality on the schedules, the common Objective of schedules, Different categories, schedules, Methods of presentation of the schedules.

Chapter 5. PERT chart **(3 Weeks)**

Definition and graphical representation of the PERT chart, Combination of the spots of the PERT chart, Conversion of the PERT planning BAR (GANTT).

Chapter 6. Conduct building **(4 Weeks)**

The key facilities, Determination of the enforcement program, detailed and simplified Determination of the enforcement program is a simplified, site Monitoring and controls work.

Method of assessment:

Exam : 100%.

Bibliography:

1. "Organisation et conduite des travaux : Partie 1 : Engins et Matériel de chantier", IUT de Saint Nazaire, Département de Génie Civil.
2. Olivier EMILE, "Organisation pratique des chantiers, Tome 1. Collection « Techniciens de la construction ».
3. MEAT, "Etude et préparation de l'ouverture d'un chantier", , INPE, -Rouiba, 1994
4. La méthode de PERT, Federal Electric Corporation. Collection « Techniciens de la construction ».

Semester: 6
Teaching unit: UET 3.2
Subject 1: Professional Project And Business Management
VHS: 22h30 (course: 1h30)
Credits: 1
Coefficient: 1

Teaching objectives

Prepare and master the tools necessary methodological professional insertion in the end of your studies, prepare for the job search. Be aware of entrepreneurship, by presenting an overview of the knowledge management relevant to the creation of activities and be able to implement a project.

Course Content:

Chapter 1 : business and society (3 weeks)

Company : Definition and objectives of the company. Different forms of business, structure of the company, phe staff and partner of the company.
Different types of business (TPE, PME,PMI,ETI,PG)
The company : Definition and objectives of the company
Different types of company (SARL, EURL, SPA, SNC,)
Difference between business and society.

Chapter 2 : Operation and organization of the company (2 weeks)

Mode of organization and operation of the company
The main functions of the company (production company, service, ...)
Company Structure (definition and characteristics)
Different types of structures (functional structure, divisionnelle, multidivisionnelle , Hiérarchico-functional 'staff and line').
Other activities of the company (partnership, subcontracting, ...).

Chapter 3 : How to access in an enterprise (3 weeks)

The needs and quality of personnel (executives, managers, technicians, workers...)
Or find the job offer (ANEM, topic, internet...)
How to make (request, the C. V.)
The different types of job interview, and how to get there for an interview.
The types of work contract (CDI / CDD)
Salary (how to calculate a payslip).

Chapter 4 : How to create his own company (3 weeks)

The course of the creator of the company (the idea, capital, financial aid ...)
How to find a good idea.
Devices of financial aid to investment (ANSEJ, CNAC, ANDI, ANGEM, NRP)

Chapter 5 : Study of an enterprise project (4 weeks)

The study of an enterprise project application to the sponsor the effort to predict and write in detail the phases and the steps they will have to make to arrive to start his / her business.

Study market (service marketing, marketing, ...).

Technical study (location, equipment needs, and machines, capacity, production,...).

Financial study (revenues, expenses, salary expenses, and consumption taxes, fees, and taxes, ...).

Mini project for the study of an enterprise project

Method of assessment:

Exam : 100%.

Bibliography:

1. Antoine Melo '' Gestion d'entreprise'' édition Melo France 2016
2. Thomas Durand '' Management d'entreprise'' édition Broché 2016
3. Philippe Guillermic '' La gestion d'entreprise pas à pas '' édition Poche 2015
4. Guy Raimbault ''Outils de gestion'' édition Chihab Alger 1994
5. Institut de technologie financière '' Initiation comptable ''OPU Alger 1993
6. Christian Bultez ''Guide et mode d'emploi des démarches '' édition Nathan Paris 1993.