

REPUBLIQUE ALGERIENNE DEMOCRATIQUE ET POPULAIRE

MINISTERE DE L'ENSEIGNEMENT SUPERIEUR
ET DE LA RECHERCHE SCIENTIFIQUE

OFFRE DE FORMATION LICENCE ACADEMIQUE

Double Compétence

Etablissement	Faculté / Institut	Département

Domaine : Mathématiques et Informatique

Filière : Informatique

Spécialité : Mathématiques et Informatique appliquées aux Sciences Economiques
et de Gestion

Année universitaire : 2024/2025

الجمهورية الجزائرية الديمقراطية الشعبية

وزارة التعليم العالي والبحث العلمي

عرض تكوين ليسانس اكايمي

كفاءة مزدوجة

المؤسسة	الكلية/المعهد	القسم

الميدان : رياضيات وإعلام آلي

الشعبة : إعلام آلي

التخصص : رياضيات و اعلام الي مطبقة في العلوم الاقتصادية و التسيير

السنة الجامعية: 2024-2025

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I – Fiche d'identité de la Licence

1 - Localisation de la formation :

Faculté (ou Institut) :

Département :

Section :

2- Partenaires extérieurs *:

- Autres établissements partenaires :

- Entreprises et autres partenaires socio-économiques :

- Partenaires internationaux :

3 – Contexte et objectifs de la formation

A – Organisation générale de la formation:

.

B - Objectifs de la formation

C – Profils et compétences visées :

D – Potentialités régionales et nationales d'employabilité

E – Passerelles vers les autres spécialités

F – Indicateurs de suivi de la formation

4 – Moyens humains disponibles

A : Capacité d'encadrement :

B : Equipe d'encadrement de la formation :

B-1 : Encadrement Interne :

Nom, prénom	Diplôme	Grade	Laboratoire de recherche de rattachement	Type d'intervention *	Emargement

B-3 : Synthèse globale des ressources humaines :

Grade	Effectif Interne	Effectif Externe	Total
Professeurs			
Maîtres de Conférences (A)			
Maîtres de Conférences (B)			
Maître Assistant (A)			
Maître Assistant (B)			
Autre (préciser)			
Total			

B-4 : Personnel permanent de soutien (indiquer les différentes catégories)

Grade	Effectif

5 - Moyens matériels disponibles

A- Laboratoires Pédagogiques et Equipements : Fiche des équipements pédagogiques existants pour les TP de la formation envisagée (1 fiche par laboratoire)

Intitulé du laboratoire :

Capacité en étudiants :

N°	Intitulé de l'équipement	Nombre	observations
01			
02			
03			
04			
05			

II – Fiche d’organisation semestrielle des enseignements

(Prière de présenter les fiches des 6 semestres)

FTF: Face-to-face mode, ELEARN: eLearning mode, H: Hybrid mode (FTF/ELEARN)

Semester	Unit	Courses	Credit	Coef	Course	TD	TP	Evaluation		Teaching mode		
								Exam	Cont	Mode	FTF (%)	Elearning (%)
Semster 1	UFM1	Mathematic Analysis and Mathematic Logic	5	3	3H		1.5H	60%	40%	FTF	100	
		Introduction to Probabilities and Descriptive Statistics 1	4	2	3H	1.5H		60%	40%	FTF	100	
	UFC1	Machine Structure et Operating System Administration	4	2	3H	1.5H		60%	40%	FTF	100	
		Programming 1	5	3	3H	1.5H		60%	40%	FTF	100	
	UD1	Introduction to the Economic Sciences	3	2	1.5H		1.5H	60%	40%	FTF	100	
		Introduction to the Human and Social Sciences	3	2	1.5H		1.5H	60%	40%	FTF	100	
	UM1	University work	2	2	1.5H			100%		H	20	80
	UT1	Ethics and Professional Deontology	2	1	1.5H			100%		H	20	80
		English I	2	1	1.5H			100%		ELEARN		100
			30	18								
Semster 2	UFM2	Linear Algebra	5	3	3H		1.5H	60%	40%	FTF	100	
	UFC2	Introduction to Artificial Intelligence	5	3	3H	1.5H		60%	40%	FTF	100	
		Programming 2	6	3	3H	1.5H		60%	40%	FTF	100	
	UD2	Introduction to Economic Theories	3	2	1.5H		1.5H	60%	40%	FTF	100	
		Introduction to the Human and Social Sciences 2	3	2	1.5H		1.5H	60%	40%	FTF	100	
	UM2	University work 2	2	2	1.5H			100%		H	20	80
	UT2	Entrepreneurship and Management of the Enterprise	2	1	1.5H			100%		H	20	80
		Introduction to Law	2	1	1.5H			100%		H	20	80
		English II	2	1	1.5H			100%		ELEARN		100
			30	18								

M: Methodological, F: Fundamental, D: Discovery, T: Transversal

The weighting 20%, 80% means that students will be present 1 week out of 4 for each course in an alternating manner.

(*): Studied in Medicine Curriculum

Mathematics analysis and Mathematics logic (MAML)

Semester 1

Unit: UFM1

Credit: 5

Coeff: 3

Course objectives

- Understand the concept of limits and continuity.
- Apply the principles of differentiation to solve problems.
- Develop logical and formal proof skills for analysis.

Course Content:

Part I: Mathematics analysis and logic

Chapter I.1: Sequences and Series

- Convergence and divergence
- Cauchy sequences
- Monotonic sequences
- Infinite series and tests for convergence (comparison test, ratio test, root test, etc.)

Chapter I.2: Functions and Continuity

- Limits of functions
- Continuity and discontinuity of functions
- Uniform continuity
- Intermediate Value Theorem
- Extreme Value Theorem

Chapter I.3: Differentiation

- Definition and properties of the derivative
- Mean Value Theorem
- Bernoulli's rule
- Taylor series
- Applications of derivatives: concavity, inflection points, optimization

Part II: Mathematics logic

Chapter II.1: Syntax and Semantics

- Propositional variables
- Logical connectives: AND, OR, NOT, IMPLIES, IFF
- Truth tables and interpretations

Chapter II.2: Tautologies and Logical Equivalences

- Laws of logic (De Morgan's Laws, distribution, etc.)
- Logical equivalence and implications
- Normal forms (Conjunctive Normal Form, Disjunctive Normal Form)

Chapter II.3: Proof Systems

- Natural deduction
- Axiomatic systems
- Soundness and completeness theorems for propositional logic

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

"Principles of Mathematical Analysis" by Walter Rudin

Introduction to Probabilities and Descriptive Statistics (IPDS)

Semester 1

Unit: UFM1

Credit: 4

Coeff: 2

Course objectives

- Understand basic concepts of probability and random variables.
- Compute and interpret key descriptive statistics (mean, median, mode, variance, standard deviation).
- Understand and apply the laws of probability, conditional probability, and independence.

Course Content:

Chapter 1: Introduction to Statistics and Data

- Overview of statistics and its importance
- Types of data: qualitative vs. quantitative
- Introduction to data collection methods
- Measures of frequency, proportions, and percentages
- Introduction to data visualization: charts and graphs

Chapter 2: Descriptive Statistics

- Measures of central tendency (mean, median, mode)
- Measures of spread (range, variance, standard deviation)
- Z-scores and percentile ranks
- Exploratory Data Analysis (EDA)
- Graphical representations: histograms, box plots, stem-and-leaf plots

Chapter 3: Basic Probability Theory

- Introduction to probability: concepts and rules
- Sample space and events
- The addition and multiplication rules of probability
- Complementary, joint, and conditional probabilities
- Independent and dependent events

Chapter 4: Discrete Probability Distributions

- Discrete random variables and probability mass functions (PMFs)
- The binomial distribution
- The Poisson distribution
- Expected value and variance of discrete distributions

Chapter 5: Continuous Probability Distributions

- Continuous random variables and probability density functions (PDFs)
- The normal distribution
- The standard normal distribution and Z-scores
- Applications of the normal distribution (Central Limit Theorem)

Teaching mode

Face to face mode (100%)

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

"Statistics for Business and Economics" by Paul Newbold

Machine Structure et Operating System Administration (MSOS)

Semester 1

Unit: UFC1

Credit: 4

Coeff: 2

Course objectives :

The objective of these chapters is to provide a comprehensive introduction to the fundamentals of computing, including the history and architecture of computers, number systems, data representation, and basic Linux system management. This course aims to equip learners with a strong foundational understanding of computers and Linux systems, enabling them to handle tasks such as system configuration, file management, user and storage management, and data backup and restoration effectively.

Course Content:

Chapter 1: General Introduction

- History and evolution of computers.
- Basic principles of Von Neumann architecture.
- Components of a computer.

Chapter 2: Number Systems

- Definition.
- Overview of decimal, binary, octal, and hexadecimal systems.
- Conversion between these systems.
- Basic operations in the binary system:
 - Addition.
 - Subtraction.

Chapter 3: Information Representation

- Binary coding:
 - Pure binary coding.
 - Reflected binary code (or Gray code).
 - DCB code (Decimal Coded Binary).
- Representation of numbers:
- Integer numbers:
 - Unsigned representation.
 - Signed representation (SVA, 1's complement, 2's complement).
- Fractional numbers: - Fixed-point. - Floating-point (IEEE 754 standard).
- Character representation:
 - ASCII code.
 - Unicode code.

Chapter 4: Introduction to Linux

- History and evolution of Linux.
- Linux operating system architecture.
- Differences between Linux distributions.
- Installation and initial configuration of Linux.

Chapter 5: Management and Manipulation

- Command Line Usage.
- File and directory management.
- Use of basic commands (ls, cd, mkdir, rm, etc.).
- User and Group Management:
 - Creating, modifying, and deleting users.

- Assigning permissions to files and directories.
 - Managing user groups.
- Storage Management.
- Managing partitions and file systems:
 - Creating and managing logical volumes (LVM).
 - Use of fdisk, mkfs, mount commands, etc.
- Backup and Restoration: - Planning and executing backups.
 - Using backup tools (rsync, tar, etc.).
 - Restoring data from backups.

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- "Computer Organization and Design: The Hardware/Software Interface" by David A. Patterson and John L. Hennessy
- "The Linux Command Line: A Complete Introduction" by William Shotts

Programming 1 (PRG1)

Semester 1

Unit: UFC1

Credit: 5

Coeff: 3

Course objectives :

- Understand the history and fundamentals of computer science and how it has evolved to its current state.
- Comprehend the concept of algorithms and their importance in problem-solving, as well as how to represent and implement them using algorithmic language.
- Master basic data types, operations, and instructions used in programming, such as variables, constants, input/output, and assignments.
- Develop and represent simple sequential algorithms using Python, alongside the construction of flowcharts.
- Implement and understand conditional structures for decision-making in algorithms, such as simple, compound, and multiple-choice conditions in Python.
- Learn and apply looping structures (while, repeat, and for loops) to solve iterative problems, using Python.
- Understand arrays and strings as data structures, including their types, manipulations, and applications in programming.
- Utilize subprograms (functions and procedures), understanding parameter passing, local and global variables, and recursion, to write modular and efficient code.

Course Content:

Chapter 1: Introduction

- Brief history of computer science.
- Introduction to algorithms.

Chapter 2: Simple Sequential Algorithm (in algorithmic language and Python)

- Concept of language and algorithmic language.
- Parts of an algorithm.
- Data: variables and constants.
- Data types.
- Basic operations.
- Basic instructions: - Assignments. - Input/output instructions.
- Constructing a simple algorithm.
- Representing an algorithm using a flowchart.

Chapter 3: Conditional Structures (in algorithmic language and Python)

- Introduction.
- Simple conditional structure.
- Compound conditional structure.
- Multiple choice conditional structure.
- Branching.

Chapter 4: Loops (in algorithmic language and Python)

- While loop.
- Repeat loop.
- For loop.
- Nested loops.

Chapter 5: Arrays and Strings

- Introduction.
- Array type.
- Vectors and multidimensional arrays.
- Strings.

Chapter 6: Subprograms: Functions and Procedures

- Introduction.
- Definitions.
- Local and global variables.
- Parameter passing.
- Recursion.

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- "Introduction to Algorithms" by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
- "Python Programming: An Introduction to Computer Science" by John Zelle

Introduction to Economic Sciences (IES)

Semester 1

Unit: UD

Credit: 3

Coeff: 2

Course objectives

- Enable the student to integrate into the field of economic sciences.
- Help the student understand the introduction to economics and train on its core topics and important economic terms, as well as the relationship of economics with various other sciences.
- Provide the student with foundational knowledge for economic subjects that will be studied throughout their academic journey.

Course Content:

- The nature of economics
- The nature of economics and its relationship with other sciences.
- The relationship between economics, mathematics, and computer science.
- Branches of economics: microeconomic theory and macroeconomic theory.
- The economic problem: concepts of needs and scarcity, resources and means of satisfaction, and how to address the economic problem.
- Factors of production: labor, nature (land), capital, and organization.
- The economic cycle and economic agents.
- Economic activity and processes: production, income, investment, exchange, consumption, and savings.
- Economic institutions: their concepts, definitions, classifications, and characteristics.
- Market, price, and equilibrium: concept of the market, its types and participants, demand and supply, and equilibrium.
- Economic system and economic policies.
- Money and banks: their origins, types, and traditional and modern functions.
- Economic terminology: unemployment and employment, inflation, globalization and economic globalization, economic growth, economic development, and sustainable development.

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- Bradley R. Schiller , Essentials of economics , 8th , ed , New york ,2001.
- Jacques Génèreux (2017), Introduction à l'économie, nouvelle édition, points économie, French Edition.
- Stephen Dobson and Susan Palfreman, Introduction to economics, Oxford University Publisher; 1999.
- ERIC BROUSSEAU, De la Science du Marche à l'Analyse Economique des formes de coordination, Université de Nancy IXATOM (Université de Paris 1), Apparaître dans les cahiers Français N 272, 1995

- Field, B. C., & Field, M. K. Environmental economics: an introduction, 7th. McGraw-Hill Education ,2016.
- McEachern, W. A. Economics: A contemporary introduction. Cengage Learning,2016.
- Dasgupta, P. Economics: A very short introduction. OUP Oxford,2007.
- Atkinson, A. B., & Bourguignon, F. Introduction: Income distribution and economics. Handbook of income distribution,2000.

Introduction to human and social sciences 1 (IHSS1)

Semester 1

Unit: UD1

Credit: 3

Coeff: 2

Course objectives

- Ability to understand the nature of the humanities and social sciences
- Knowledge of the role of the humanities and social sciences in understanding man and society

Course Content:

Part 1: A conceptual introduction to the humanities and social sciences

1. The concept of the humanities
2. The concept of the social sciences
3. The interdisciplinarity and integration between the humanities and social sciences
4. The importance of the humanities and social sciences in modern societies

Part 2 Fields of human sciences and social sciences.

1. Human sciences: library science, archaeology, media and communication, etc.
2. Social sciences: Sociology, psychology, educational sciences, philosophy, demography, etc.

Part 3: major topics in the field of humanities and social sciences

1. Globalization
2. Communication
3. Memory (History, Archives, Archeology...)
4. Cultural diversity
5. ... Other

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- HUNT, Elgin F., COLANDER, David C. - *Social Science - An Introduction To The Study of Society*. London: Routledge, 2016
- WOODWARD, Kath *Social Sciences: The Big Issues*. London: Routledge, 2021
- DORTIER, Jean-François. *Les sciences humaines. Panorama des connaissances*. Paris: Éditions Sciences Humaines, 2001
- GUSDORF, G. *Introduction aux sciences humaines. Essai critique sur leurs origines et leur développement*. Paris : Les éditions Ophrys. 1974
- FEUERHAHN, W. *Les sciences humaines et sociales : des disciplines du contexte*. Paris : Les éditions Ophrys, [S.D.]
- ROYCE, EDWARD; *Classical Social Theory and Modern Society*. London: Weber, 2015
- PERRY, John A., PERRY, Erna K. *Contemporary society: An Introduction to Social Science*. New York: Routledge, 2016.
- DELTHEY, Wilhelm. *Introduction to the Human sciences*, New jersey: Princeton university press, 1989.
- JONATHAN H. Turner. *Theoretical Sociology A Concise Introduction to Twelve Sociological Theories*. USA: Sage Publications, 2014.

University work 1(UW1)

Semester 1

Unit: UM1

Credit: 2

Coeff: 2

Course objectives

- Positive participation in university life
- Giving a good image of the university

Course Content:

Part1: LMD training system

1. The university, its social role and its objectives in global development
2. The training system in the Bachelor's, Master's and Doctorate
3. Explanation of terms: field, department and specialization
4. Meaning of the educational unit: Fundamental, Methodological, exploral, Transverse
5. Meaning of credit, coefficients, individual work
6. Nature of pedagogical assessment: lectures, practical work, Tutorial session
7. Conditions for transition and success during the training course
8. University guidance criteria and bridges and crossings between training course

Part2: - Distance education via electronic platforms

1. The university student is the focus of the educational process
2. Modern technologies in the educational and learning process
3. E-learning platforms (Moodle, MOOCs, DUAL... etc.)

Part3: Training on university work techniques

1. Using research methods and technological applications in study and research
2. Preparing a reading sheet and summarizing lessons
3. Preparing and presenting works using specialized applications

Part4: Integration into University Life

1. What's University Life
2. Emotional Intelligence and Teamwork Skills
3. Pedagogical Support for People with Disabilities and Their Integration into University Life
4. Participation in Scientific, Cultural and Sports Activities
5. Psychological Assistance Centers within the University

Teaching mode

Elearning (80%), Face to face mode (20%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- MINISTERE DE L'ENSEIGNEMENT SUPERIEUR ET DE LA RECHERCHE SCIENTIFIQUE. Guide pratique de mise en œuvre et de suivi du LMD. Alger : MESRS, 2011
- BARKLEY, Elizabeth F. Student engagement techniques: a handbook for a college faculty. USA: Jossey bas, 2010

- O'SHEA, Sarah [et al]. First in family students, university experience and family life: motivations, transitions and participation. Australia: Mc-Milan, 2017
- ROBERTS, Andrew. The thinking student guide to college: 75 tips for getting a better education. Chicago: University Chicago press, 2010

Ethics and Professional Deontology (EPD)

Semester 1

Unit: UT1

Credit: 2

Coeff: 1

Course objectives

- This course aims to provide students with the fundamental concepts of ethics and professional deontology, enhancing their awareness of the importance of adhering to professional ethics in the workplace. Students will learn how ethics influence the behavior of individuals and institutions, as well as the role of professional ethics in promoting transparency, credibility, and justice across various professions.

This course also allows students to:

- Understand the difference between ethics and professional deontology.
- Apply ethical standards in various fields of work.
- Identify ethical challenges and learn how to address them in professional life.

Course Content:

1. The Concept of Ethics

- Definition of ethics
- The difference between ethics and values
- The philosophical foundations of ethics
- The evolution of ethical concepts throughout history

2. The Concept of Professional Deontology

- Definition of professional deontology
- The difference between general ethics and professional deontology
- The importance of professional deontology in the workplace
- The fundamental principles of professional deontology (honesty, integrity, justice, responsibility)

3. Professional Deontology in Different Fields

- Ethics in the medical profession
- Ethics in the engineering profession
- Ethics in the teaching profession
- Ethics in the legal profession

4. Ethical Challenges in Professional Work

- Administrative corruption
- Conflict of interest
- Abuse of power
- Bias and discrimination in the workplace

5. The Role of Institutions in Promoting Professional Deontology

- Codes of professional conduct
- Employee ethics training
- Monitoring and transparency in professions
- Penalties for unethical behavior

6. The Relationship Between Ethics and Social Responsibility

- Definition of social responsibility

- The role of companies in achieving sustainable development
- The impact of professional behavior on society

7. Professional Ethics in the Digital Age

- Ethical challenges associated with modern technology
- Privacy and data protection
- Professional integrity in the digital world

Teaching mode

Elearning (80%), Face to face mode (20%).

Assessment mode

Final Exam (100%).

Recommended Textbooks:

- Beauchamp, T. L., & Childress, J. F. (2019). **Principles of Biomedical Ethics** (8th ed.). Oxford University Press.
- Banks, S. (2012). **Ethics and Values in Social Work** (4th ed.). Palgrave Macmillan.
- Evetts, J. (2013). **Professionalism: Value and ideology**. *Current Sociology*, 61(5-6), 778-796. <https://doi.org/10.1177/0011392113479316>
- Davis, M. (2017). **Ethics and the University** (2nd ed.). Routledge.
- Kitchener, K. S. (2000). **Foundations of Ethical Practice, Research, and Teaching in Psychology**. Lawrence Erlbaum Associates.
- May, W. F. (1980). **Codes of Ethics: Some History**. *The Hastings Center Report*, 10(4), 9-11. <https://doi.org/10.2307/3561140>
- Singer, P. (2011). **Practical Ethics** (3rd ed.). Cambridge University Press.
- Callahan, D. (2012). **The Roots of Bioethics: Health, Progress, Technology, Death**. Oxford University Press.

English Communication 1 (ENC1)

Semester 1

Unit: UT1

Credit: 2

Coeff: 1

Course objectives: Students should have the B1 level in the end of Semester 1

Course Content:

1. Speaking Skills
2. Listening Skills
3. Reading Skills
4. Writing Skills
5. Grammar and Vocabulary
6. Pronunciation

Teaching mode

eLearning (100%).

Assessment mode

Exam (100%).

Recommended Textbooks:

"English File Intermediate" by Christina Latham-Koenig and Clive Oxenden

Linear Algebra (LIA)

Semester 2

Unit: UFM2

Credit: 5

Coeff: 3

Course objectives :

- Develop logical reasoning skills and understand algebraic structures like sets, functions, and rings.
- Perform matrix operations and solve systems of linear equations using Gaussian elimination.
- Understand vector spaces, their basis, dimension, and apply the rank-nullity theorem.
- Analyze linear transformations and their matrix representations, including kernel and image.
- Use change of basis techniques to simplify vector and transformation problems.

Course Content:

1. Foundations of Discrete and Algebraic Mathematics
 - Logic and Reasoning
 - Sets, Functions, and Relations
 - Algebraic Structures
 - Polynomial Ring
2. Matrices and Systems of Linear Equations
 - Matrix operations (addition, multiplication, inverse)
 - Determinants and properties of determinants
 - Gaussian elimination and echelon forms
 - Systems of linear equations: consistency and uniqueness
3. Vector Spaces
 - Definition of vector spaces and subspaces
 - Basis and dimension
 - Row space, column space, and null space of a matrix
 - Rank-nullity theorem
4. Linear Transformations
 - Definition and properties of linear transformations
 - Matrix representation of linear transformations
 - Kernel and image of a linear transformation
 - Change of basis

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- Linear Algebra and Its Applications by Gilbert Strang
- Linear Algebra Done Right by Sheldon Axler.

Introduction to Artificial Intelligence (IAI)

Semester 2

Unit: UFC2

Credit: 5

Coeff: 3

Course Objectives: This course is aimed at developers and students in the fields of computer science and engineering who are interested in AI. In this course, students will explore AI, understand what it's for and why mathematics is involved in subsequent courses. In this course, students will be able to: Understand the role of AI in industry; Define AI hardware and software; and finally, Evaluate the importance of datasets, data sources, problem solving with data and data science workflows.

Course Content:

Chapter 1. Introduction

- The definition of the Artificial Intelligence;
- Historical developments that now differentiate modern AI from earlier AI;
- The differences between supervised and unsupervised learning;
- Examples of AI applications.

Chapter 2. Artificial intelligence in the industry

- Health and genomics;
- Transportation and automated driving;
- Retail and supply chain;
- Finance;
- Industrial;
- Government.

Chapter 3. Artificial intelligence in the enterprise

- Steps of the data science workflow;
- Key roles and skills in AI;
- Ways to structure an AI team;
- Common misconceptions in data science;
- Components of post-deployment AI model maintenance.

Chapter 4. AI development tools

- Google Collab;
- Jupyter;
- NumPy;
- Matplotlib, SciKits Learn et Pandas.

Chapter 5. Supervised Learning

- How to formulate a supervised learning problem;
- Compare and understand the differences between training and inference;
- Describe the dangers of overfitting against test data.

Chapter 6. Data collection and enhancement

- Know when more data samples are necessary.
- Handling and augmenting data with feature engineering.
- Identify problems such as overfitting and underfitting.
- Popular datasets used in neural network training.
- Data pre-processing methods.
- Data labeling.

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

Artificial Intelligence: A Modern Approach, 4th US ed. by Stuart Russell and Peter Norvig

Programming 2 (PGM2)

Semester 1

Unit: UFC2

Credit: 6

Coeff: 3

Course Objectives:

- Master advanced algorithmic concepts and design techniques to solve complex problems efficiently.
- Understand and implement linked lists, stacks, and queues, focusing on dynamic memory management.
- Explore and apply advanced data structures like trees and graphs for effective data manipulation and problem-solving.
- Implement and analyze advanced sorting and search algorithms, and apply graph algorithms to real-world problems.

Course Content:

Chapter 1: Design and Analysis of an Algorithm

- Advanced concepts in algorithmics.
- Algorithm design techniques (divide and conquer, recursion...).
- Analysis and calculation of algorithm complexity.

Chapter 2: Linked Lists (in algorithmics and in Python)

- Introduction.
- Pointers.
- Dynamic memory management.
- Linked lists.
- Operations on linked lists.
- Doubly linked lists.
- Stacks and queues.

Chapter 3: Advanced Data Structures (in algorithmics and in Python)

- Trees (Binary trees, specialized binary trees, etc.).
- Graphs (Representation, traversal, search algorithms, etc.).
- Advanced data structures (Heaps, Hash tables, etc.).

Chapter 4: Advanced Algorithms (in algorithmics and in Python)

- Advanced sorting algorithms (Quick sort, Merge sort, etc.).
- Advanced search algorithms (Binary search, Interpolation search, etc.).
- Graph algorithms (Depth-first search, Breadth-first search, Shortest paths, etc.).

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- "Introduction to Algorithms" by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein
- "Algorithms" by Robert Sedgewick and Kevin Wayne
- "Python Algorithms" by Magnus Lie Hetland

Introduction to Economic Theories (IET)

Semester 2

Unit: UD2

Credit: 3

Coeff: 2

Course objectives

To enable students to grasp various schools of thought regarding their theories and intellectual approaches to key economic issues.

Course Content:

- Economic thought in ancient Eastern civilizations.
- Economic thought in ancient Western societies and the Middle Ages in Europe.
- Mercantilist economic thought.
- Economic thought in the Islamic era.
- Natural economic thought.
- Classical economic thought.
- Liberal capitalist economic thought and its stages.
- French socialist and Marxist economic thought.
- Economic thought of the historical school in Germany.
- Marginalist neoclassical economic thought.
- Keynesian economic thought and contemporary economic theories (Post-Keynesian).

Teaching mode

Face to face mode (100%)

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- Blaug, M. (1997). *Economic theory in retrospect* (5th ed.). Cambridge University Press.
- Medema, S. G., & Samuels, W. J. (2003). *The history of economic thought: A reader*. Routledge.
- Screpanti, E., & Zamagni, S. (2005). *An outline of the history of economic thought* (2nd ed.). Oxford University Press.
- Backhouse, R. E. (2002). *The ordinary business of life: A history of economics from the ancient world to the twenty-first century*. Princeton University Press.
- Ekelund, R. B., & Hébert, R. F. (2007). *A history of economic theory and method* (5th ed.). Waveland Press.
- Spiegel, H. W. (1991). *The growth of economic thought* (3rd ed.). Duke University Press.
- Hunt, E. K., & Lautzenheiser, M. (2011). *History of economic thought: A critical perspective* (3rd ed.). Routledge.
- Samuelson, P. A. (1947). *Foundations of economic analysis*. Harvard University Press.

Introduction to human and social sciences 2 (IHSS2)

Semester 1

Unit: UD2

Credit: 6

Coeff: 4

Course objectives

- Ability to understand the nature of the humanities and social sciences
- Knowledge of the role of the humanities and social sciences in understanding man and society

Course Content:

Part1: Theory in the field of humanities and social sciences

1. Major theories in the humanities
2. Major theories in the social sciences

Part2: Digital Humanities

1. Digital Humanities (concept, development and historical roots)
2. Practical applications of Digital Humanities (education and machine learning)
3. Digital transition and digital transformation
4. Innovation in Digital Humanities
5. Intersection of Artificial Intelligence with the Humanities and Social Sciences

Teaching mode

Face to face mode (100%).

Assessment mode

Exam (60%), Continuous assessment (40%).

Recommended Textbooks:

- HUNT, Elgin F., COLANDER, David C. - Social Science - An Introduction To The Study of Society. London: Routledge, 2016
- WOODWARD, Kath Social Sciences: The Big Issues. London: Routledge, 2021
- DORTIER, Jean-François. Les sciences humaines. Panorama des connaissances. Paris: Éditions Sciences Humaines, 2001
- GUSDORF, G. Introduction aux sciences humaines. Essai critique sur leurs origines et leur développement. Paris : Les éditions Ophrys. 1974
- FEUERHAHN, W. Les sciences humaines et sociales : des disciplines du contexte. Paris : Les éditions Ophrys, [S.D.]
- ROYCE, EDWARD; Classical Social Theory and Modern Society. London: Weber, 2015
- PERRY, John A., PERRY, Erna K. Contemporary society: An Introduction to Social Science. New York: Routledge, 2016.
- DELTHEY, Wilhelm. Introduction to the Human sciences, New jersey: Princeton university press, 1989.
- JONATHAN H. Turner. Theoretical Sociology A Concise Introduction to Twelve Sociological Theories. USA: Sage Publications, 2014

University work 2 (UW2)

Semester 2

Unit: UM2

Credit: 2

Coeff: 2

Course objectives

- Ability to communicate smoothly
- Ability to work in a team and associative

Course Content:

Part1: Learning and organizing the educational environment

1. The concept of learning and its methods
2. Self-learning skills
3. Time organization and management skills
4. Skills for organizing the student's educational space.

Part2: Pedagogical accompaniment

1. What's pedagogical accompaniment
2. Pedagogical and personal objectives of accompaniment
3. On line pedagogical accompaniment

Part3: Prevention of social ills: drugs, suicide, ... etc.

1. The concept of social problems
2. Types of social problems: smoking, drugs, suicide, etc.
3. Health, psychological and social effects of social problems

Teaching mode

Elearning (80%), Face to face mode (20%).

Assessment mode

Exam (100%).

Recommended Textbooks:

- ROBERTS, Andrew. *The thinking student guide to college: 75 tips for getting a better education*. Chicago: University Chicago press, 2010
- MINISTERE DE L'ENSEIGNEMENT SUPERIEUR ET DE LA RECHERCHE SCIENTIFIQUE. *Guide pratique de mise en œuvre et de suivi du LMD*. Alger : MESRS, 2011
- BARKLEY, Elizabeth F. *Student engagement techniques: a handbook for a college faculty*. USA: Jossey bas, 2010
- O'SHEA, Sarah [et al]. *First in family students, university experience and family life: motivations, transitions and participation*. Australia: Mc-Milan, 2017

Entrepreneurship and Management of the Enterprise (EME)

Semester 2

Unit: UT2

Credit: 2

Coeff: 1

Course objectives

- Understand the concept of an enterprise, its characteristics, roles, and objectives.
- Learn about the enterprise environment.
- Master the concept of an enterprise as an economic agent, and learn about its origin and development, as well as the different types of enterprises.
- Highlight the importance of entrepreneurial education in promoting the spirit of creation and establishing enterprises for university students, by demonstrating the contents of entrepreneurial education programs, the necessary characteristics and skills for creating projects, and the socio-economic environment that fosters entrepreneurial culture.
- Master the concepts related to entrepreneurship.
- Understand and be knowledgeable about the socio-economic environment of entrepreneurship.
- Master the process of establishing an entrepreneurial project.
- Learn about the institutions that support entrepreneurship in the academic environment (and everything related to implementing Decision 1275 University Diploma/Startup - University Diploma/Patent).

Course Content:

- Unit 1: The enterprise: its concept, origin, development, and classifications
- Unit 2: The internal and external environment of the enterprise
- Unit 3: Organization and structures of the enterprise
- Unit 4: Enterprise functions
- Unit 5: Introduction to entrepreneurship and its forms
- Unit 6: Stages of establishing an entrepreneurial project
- Unit 7: Entrepreneurial support and assistance structures in Algeria
- Unit 8: From innovative project to startup

Teaching mode

Elearning (80%), Face to face mode (20%).

Assessment mode

Exam (100%).

Recommended Textbooks:

Continuous assessment + final exam. The course grade is based on the weighted average of lectures (60%) and directed work (40%).

Reference :

Chanteux A. et Niessen W. (2006). Les tableaux de bord et business plan. L. Venanzi, Edi.pro, Liège Belgique.

- Haidar, J.I, "Impact of Business Regulatory Reforms on Economic Growth," Journal of the Japanese and International Economies, Elsevier, vol. 26(3), , September2012
- Mark Van Osnabrugge and Robert J. Robinson, Angel Investing, the economist revue March 11, 2006.
- M.E KRUGER, "Entrepreneurship theory and practice", university of Pretoria etd, South Africa, 2004.
- Alain fayolle 'le métier de créateur d'entrepris 'tone2 ' les éditions d' organisation '2003.
- Mater .V, Zenovta .C : " Entrepreneurship versus Intrapreneurship ", Review of International Comparative Management ,Vol .(12) , No.(5) , Dec, 2011
- M Darbelet (1996) : *Économie d'Entreprise : BTS, enseignement supérieur*, Editions Foucher . Paris.
- Rudolf Brennemann et Sabine Sépari (2001), *Economie d'Entreprise*, Editions Dunod, Paris.
- N. Mankiw, Mark Taylor and Andrew Ashwin (2019), *Business Economics*, 3rd Edition, Cengage Learning EMEA Publisher.
- www.ansej.dz.
- www.cnac.dz
- www.angem.dz.
- www.sofinance.dz
- www.eldjazair-istithmar.dz
- www.commerce.gov.dz

Introduction to Law (ILW)

Semester 2

Unit: UT2

Credit: 2

Coeff: 1

Course objectives

To provide the student with the necessary amount of well-defined legal knowledge through law lessons, enabling them to act responsibly through informed practice.

Course Content:

- The concept of law
- Legal rule: definition, elements, characteristics, and divisions
- Divisions of law
- Sources of law
- Application of law concerning individuals
- Application of law concerning place and time
- Rights and their types (non-financial rights, financial rights, intellectual rights)
- Persons of rights (natural person and legal person) and their subject
- Means of proving rights and reasons for their termination
- Responsibility (criminal, civil, and disciplinary)
- Judicial organization in Algeria

Teaching mode

Elearning (80%), Face to face mode (20%).

Assessment mode

Final Exam (100%)

Recommended Textbooks:

1. Beatty, J. F., Samuelson, S. S., & Abril, P. S. (2021). Introduction to Business Law (7th ed.). Cengage Learning.
2. Curzon, L. B. (2019). Law Made Simple (14th ed.). Routledge.
3. Gardner, S. (2018). Introduction to the Law of Contract (6th ed.). Oxford University Press.
4. Hames, J. B., & Ekern, Y. (2020). Introduction to Law (7th ed.). Pearson.
5. McLeod, I. (2017). Legal Method (10th ed.). Palgrave Macmillan.
6. Harris, P. (2019). An Introduction to Law (9th ed.). Cambridge University Press.
7. Keenan, D., & Riches, S. (2019). Smith & Keenan's English Law (18th ed.). Pearson.
8. Beatty, J. F., Samuelson, S. S., & Abril, P. S. (2021). Introduction to Business Law (7th ed.). Cengage Learning

English 2 (ENG2)

Semester 2

Unit: UT2

Credit: 2

Coeff: 1

Course objectives: Students should have the B2 level at the end of Semester 2

1. Speaking Skills
2. Listening Skills
3. Reading Skills
4. Writing Skills
5. Grammar and Vocabulary
6. Pronunciation

Teaching mode

eLearning (100%).

Assessment mode

Exam (100%).

Recommended Textbooks:

"English File Upper-Intermediate" by Christina Latham-Koenig and Clive Oxenden