Subjects Modules for S4

Artificial Intelligence

Semester 2 Year 2

U4.1 Statistics

Inferential Statistics

Module designation	**Statistics**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.1
Subtitle, if applicable	
Courses, if applicable	**Inferential Statistics**
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Ms. Chahnez Thabet
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours Lecture/ semester 21 hours practical workshop in Lab/ semester
Workload	Total 77 hours/semester (35 hours of Self-Study/semester)
Credit points	3
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Probability and Statistics foundations
Module objectives/intended learning outcomes	**Objective:** This course gives a thorough introduction to point estimators and discusses various techniques to estimate and optimize parameters. Special focus is given to a detailed discussion of both statistical and systematic uncertainties as well as propagation of uncertainties. **Learning Outcomes:** Upon completion of this course, students should be able to: • understand point estimation methods. • apply maximum likelihood and ordinary least squares method to estimate parameters. • comprehend the concept of statistical and systematic errors. • employ error propagation methods. • utilize Bayesian inference and non-parametric techniques. • evaluate statistical tests. • grasp the fundamentals of statistical decision theory.

Content	**Chapter 1: Point Estimation** 1. Method of moments 2. Sufficient statistics 3. Maximum likelihood 4. Ordinary least squares 5. Resampling techniques **Chapter 2: Uncertainties** 1. Statistical and systematic uncertainties 2. Propagation of uncertainties **Chapter 3: Bayesian Inference & Non-parametric Techniques** 1. Bayesian parameter estimation 2. Prior probability functions 3. Parzen windows 4. K-nearest-neighbours **Chapter 4: Statistical Testing** 1. A/B testing 2. Hypothesis tests & test statistics 3. P-values & confidence intervals 4. Multiple testing **Chapter 5: Statistical Decision Theory** 1. The risk function 2. Maximum likelihood, Minimax, and Bayes 3. Admissibility and Stein's paradox
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	1. Wasserman, L. (2004). All of statistics: A concise course in statistical inference. Springer. 2. Downey, A. B. (2014). Think stats (2nd ed.). O'Reilly.

U4.1 Statistics

Statistics Workshop with R

Module designation	**Statistics**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.1
Subtitle, if applicable	
Courses, if applicable	**Statistics Workshop with R**
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Ms. Dorra Grami
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours practical workshop in Lab/ semester
Workload	Total 42 hours/semester (21 hours of Self-Study/semester)
Credit points	3
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Probability and Statistics foundations Algorithmics
Module objectives/intended learning outcomes	**Objective:** To introduce students to essential statistical methods and data analysis using the R programming language through hands-on practice. **Learning Outcomes:** Upon completion of this course, students should be able to: • Use R for data manipulation and statistical analysis • Generate visual and numerical summaries of datasets • Apply hypothesis tests and interpret results • Perform regression and basic modeling • Create reproducible reports with R Markdown

Content	**Chapter 1: Introduction to R and Data Handling** 1. Basics of R and RStudio 2. Data import and cleaning **Chapter 2: Descriptive Statistics & Visualization** 1. Summarizing data 2. Charts with ggplot2 **Chapter 3: Probability & Distributions** 1. Normal, binomial, and Poisson laws 2. Random sampling and simulation **Chapter 4: Inferential Statistics** 1. Hypothesis testing 2. Confidence intervals **Chapter 4: Correlation & Regression** 1. Simple linear regression 2. Correlation analysis **Final Project** • Real dataset analysis and report with R Markdown
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%) (Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	1. R for Data Science – Grolemund & Wickham 2. CRAN R Project – https://cran.r-project.org 3. RStudio Cheatsheets – https://posit.co/resources/cheatsheets

U4.2 Artificial Intelligence

Deep Learning

Module designation	**Artificial Intelligence**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.2
Subtitle, if applicable	
Courses, if applicable	**Deep Learning**
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Ms. Zahra Kodia
Language	English
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours practical workshop in Lab/ semester 21 hours of Supervised projects on Campus/ semester
Workload	Total 84 hours/semester (42 hours of Self-Study/semester)
Credit points	3
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Proficiency in Python programming. Basic understanding of data analysis and statistics. Familiarity with fundamental algorithms and data structures.
Module objectives/intended learning outcomes	**Objective:** To introduce students to the fundamentals and applications of deep learning, focusing on neural networks, training techniques, and real-world use cases using modern frameworks such as TensorFlow or PyTorch. **Learning Outcomes:** Upon completion of this course, students should be able to: • Understand and implement core deep learning architectures • Train and optimize neural networks using standard techniques • Use CNNs and RNNs for real-world applications • Leverage pre-trained models and transfer learning • Build, evaluate, and deploy deep learning models using TensorFlow or PyTorch

Content	**Chapter 1: Introduction to Deep Learning** 1. History and scope 2. Neural networks vs traditional ML **Chapter 2: Artificial Neural Networks (ANNs)** 1. Architecture, activation functions 2. Forward and backpropagation 3. Loss functions, optimizers 4. Overfitting and regularization (dropout, batch norm) **Chapter 3: Convolutional Neural Networks (CNNs)** **Chapter 4: Recurrent Neural Networks (RNNs) & LSTMs** **Chapter 5: Transfer Learning & Pretrained Models** **Chapter 6: Deep Learning Tools and Frameworks** 1. TensorFlow or PyTorch 2. Model building, training, and evaluation
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%) (Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	1. Ian Goodfellow, Yoshua Bengio, Aaron Courville – Deep Learning 2. François Chollet – Deep Learning with Python 3. Aurélien Géron – Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow 4. PyTorch & TensorFlow official documentation

U4.2 Artificial Intelligence

Multi-agent Systems

Module designation	**Artificial Intelligence**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.2
Subtitle, if applicable	
Courses, if applicable	**Multi-agent Systems**
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Ms. Kadria Ezzine
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours Lecture/ semester 21 hours of Supervised projects on Campus/ semester
Workload	Total 63 hours/semester (21 hours of Self-Study/semester)
Credit points	3
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Artificial Intelligence
Module objectives/intended learning outcomes	**Objective:** To introduce students to the principles, architectures, and coordination strategies of multi-agent systems (MAS), enabling them to design and implement systems composed of autonomous, interactive, and intelligent agents. **Learning Outcomes:** Upon completion of this course, students should be able to: • Understand the foundations and challenges of MAS • Model environments and agent interactions • Design agent communication and coordination strategies • Analyze decision-making in distributed contexts • Develop basic MAS applications using suitable frameworks

Content	**Chapter 1: Introduction to Multi-Agent Systems** **Chapter 2: Agents and Environments** 1. Reactive vs. deliberative agents 2. Agent architectures **Chapter 3: Agent Communication** 1. Communication languages (e.g., KQML, FIPA ACL) 2. Protocols and message passing **Chapter 4: Coordination and Cooperation** 1. Distributed planning, task allocation 2. Contract Net Protocol, auctions **Chapter 5: Multi-Agent Decision Making** 1. Game theory basics 2. Negotiation and consensus **Chapter 6: Learning in Multi-Agent Systems** 1. Reinforcement learning for agents 2. Emergent behavior and adaptation **Chapter 7: Applications and Case Studies**
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	1. Michael Wooldridge – An Introduction to MultiAgent Systems, Wiley 2. Gerhard Weiss (Ed.) – Multiagent Systems: A Modern Approach to Distributed Artificial Intelligence 3. Yoav Shoham & Kevin Leyton-Brown – Multiagent Systems: Algorithmic, Game-Theoretic, and Logical Foundations

U4.2 Artificial Intelligence

Data Preprocessing and Visualization

Module designation	**Artificial Intelligence**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.2
Subtitle, if applicable	
Courses, if applicable	**Data Preprocessing and Visualization**
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Mr. Nassim Bahri
Language	English
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours practical workshop in Lab/ semester 21 hours of Supervised projects on Campus/ semester
Workload	Total 77 hours/semester (35 hours of Self-Study/semester)
Credit points	3
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Proficiency in Python programming. Familiarity with fundamental algorithms and data structures.
Module objectives/intended learning outcomes	**Objective:** To equip students with the fundamental skills to clean, transform, and visualize data for analytical and machine learning tasks, using tools like Python (Pandas, Matplotlib, Seaborn) **Learning Outcomes:** Upon completion of this course, students should be able to: • Clean and preprocess datasets for analysis and modeling • Apply transformations to enhance data quality • Explore data patterns using statistical summaries and visual tools • Use visualization to communicate data insights effectively

Content	**Chapter 1: Introduction to Data Preparation** 1. Importance of preprocessing in data science 2. Overview of the pipeline: from raw to clean data **Chapter 2: Data Cleaning** 1. Handling missing, duplicate, and inconsistent data 2. Data type conversions and outlier detection **Chapter 3: Data Transformation** 1. Normalization and standardization 2. Encoding categorical variables 3. Feature engineering **Chapter 4: Exploratory Data Analysis (EDA)** 1. Descriptive statistics 2. Correlation analysis **Chapter 5: Data Visualization Basics** 1. Bar charts, histograms, scatter plots 2. Box plots and heatmaps **Chapter 6: Advanced Visualization Techniques** 1. Time series plots, interactive dashboards 2. Multivariate visualizations
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%) (Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	1. Wes McKinney – Python for Data Analysis, O'Reilly 2. Hadley Wickham – ggplot2: Elegant Graphics for Data Analysis, Springer 3. Alberto Cairo – The Truthful Art: Data, Charts, and Maps for Communication

U4.3 Information Technologies

Blockchain Technology

Module designation	**Information Technologies**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.3
Subtitle, if applicable	
Courses, if applicable	**Blockchain Technology**
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Mr Mahmoud Somrani
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours Lecture/ semester
Workload	Total 42 hours/semester (21 hours of Self-Study/semester)
Credit points	2
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	None
Module objectives/intended learning outcomes	**Learning Outcomes:** Upon completion of this teaching module, the student will be able to: • Understand the fundamental concepts of blockchain technology, including decentralized ledger, cryptographic hashing, and consensus mechanisms. • Analyze the benefits and challenges of blockchain technology in various applications. • Design and implement basic blockchain applications using smart contracts and decentralized applications (DApps). • Evaluate security considerations and best practices in blockchain development. • Critically assess real-world blockchain use cases and their impact on different industries.

Content	**Chapter 1: Introduction to Blockchain** 1. What is Blockchain? 2. History and Evolution of Blockchain Technology 3. Key Terminologies: Blocks, Decentralization, Consensus Mechanisms 4. Use Cases and Importance of Blockchain **Chapter 2: Blockchain Architecture** 1. Blockchain Components: Nodes, Transactions, Blocks 2. Public vs. Private Blockchains 3. Blockchain Protocols: Bitcoin, Ethereum, Hyperledger 4. How Mining Works **Chapter 3: Cryptography in Blockchain** 1. Role of Cryptography in Blockchain 2. Public and Private Keys 3. Digital Signatures 4. Hash Functions **Chapter 4: Consensus Mechanisms** 1. Proof of Work (PoW) 2. Proof of Stake (PoS) 3. Delegated Proof of Stake (DPoS) 4. Practical Byzantine Fault Tolerance (PBFT) **Chapter 5: Smart Contracts** 1. Understanding Smart Contracts 2. Introduction to Solidity (Ethereum) 3. Writing and Deploying a Simple Smart Contract 4. Use Cases for Smart Contracts **Chapter 6: Blockchain Challenges and Limitations** 1. Scalability and Performance Issues 2. Security Concerns

	3. Regulatory and Legal Challenges 4. Environmental Impact **Chapter 7: Real-world Applications** 1. Blockchain in Finance and Banking 2. Supply Chain Management 3. Healthcare and Pharmaceuticals 4. Voting and Governance Systems 5. Cross-Industry Use Cases
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	4. D. Drescher, Blockchain Basics: A Practical Approach, 2018 5. P. Vigna, The Truth Machine: The Blockchain and the Future of Everything, 2018 6. S. Vyasl, Blockchain Technology Exploring Opportunities, Challenges, and Applications, 2022

U4.3 Information Technologies

Information Technology Management (ERP, CRM)

Module designation	**Information Technologies**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.3
Subtitle, if applicable	
Courses, if applicable	**Information Technology Management (ERP, CRM)**
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Mr. Imed Hammadi
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours Lecture/ semester
Workload	Total 42 hours/semester (21 hours of Self-Study/semester)
Credit points	2
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Database and Software Engineering
Module objectives/intended learning outcomes	**Objectives:** The objective of this course is to provide the student with knowledge related to the implementation of integrated management software packages, ERP. The course deals with the roles and issues of integrated systems in a project management context and will allow the student to evaluate the technological needs of a company during the implementation and configuration of integrated systems. The student should understand what an ERP and/or CRM is, and what issues they address for the company

Content	**Course elements:** 1. The company and the management information system - importance of the IS 2. Definition and role of an ERP/CRM. 3. Methodology and selection criteria. 4. Presentation of the different modules of an ERP 5. Functioning and integration process. 6. Configuring a mini case in an open-source ERP. 7. Administration and advanced concepts. **Content of the Practical Work:** • PW 1: Installation and configuration of an open-source ERP: Odoo • PW 2: Database initialization (Third party, Products...) and ERP handling • PW 3: Workflows and business processes • PW 4: Realization of a commercial workflow (Quotes, orders, invoices...). • PW 5: Realization of a manufacturing workflow (PO, Bill of Materials...). • PW6: Discovery of the CRM functionalities • PW 7: Initialization of accounts, contacts, prospects...
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	Mainly training materials and official ERP documentation on the web. (www.odoo.com)

U4.4 Data Science

Machine Learning

Module designation	**Data Science**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.4
Subtitle, if applicable	
Courses, if applicable	**Machine Learning**
Semester(s) in which the module is taught	**Semester 4**
Person responsible for the module	Dept Head
Lecturer	Mr. Mehdi Kaabi
Language	English
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours practical workshop in Lab/ semester 21 hours of Supervised projects on Campus/ semester
Workload	Total 84 hours/ Semester (42 hours of Self Study)
Credit points	3
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic knowledge of artificial intelligence / Data Mining. Python programming
Module objectives/intended learning outcomes	**Course Objectives:** Machine Learning (ML) is basically that field of computer science with the help of which computer systems can provide sense to data in much the same way as human beings do. In simple words, ML is a type of artificial intelligence that extract patterns out of raw data by using an algorithm or method. The key focus of ML is to allow computer systems to learn from experience without being explicitly programmed or human intervention. **Learning outcomes:** Student will learn: • The difference between the two main types of machine learning methods: supervised and unsupervised • Supervised learning algorithms, including classification and regression • Unsupervised learning algorithms, including Clustering and Dimensionality Reduction • How statistical modeling relates to machine learning and

	how to compare them • Real-life examples of the different ways machine learning affect society
Content	**Module 1 - Introduction to Machine Learning** Applications of Machine Learning Supervised vs Unsupervised Learning Python libraries suitable for Machine Learning **Module 2 - Regression** Linear Regression Non-linear Regression Model evaluation methods **Module 3 - Classification** K-Nearest Neighbour Decision Trees Logistic Regression Support Vector Machines Model Evaluation **Module 4 - Unsupervised Learning** K-Means Clustering Hierarchical Clustering Density-Based Clustering **Module 5 - Recommender Systems** Content-based recommender systems Collaborative Filtering
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%)(Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1. Marc Peter Deisenroth, A. Aldo Faisal, Cheng Soon Ong, Mathematics for Machine Learning, Cambridge University Press (23 April 2020) 2. Tom M. Mitchell- Machine Learning - McGraw Hill Education, International Edition 3. Aurélien Géron Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, O'Reilly Media, Inc. 2nd Edition 4. Ian Goodfellow, Yoshoua Bengio, and Aaron Courville Deep Learning MIT Press Ltd, Illustrated edition Christopher M. Bishop Pattern Recognition and Machine Learning - Springer, 2nd edition 5. Trevor Hastie, Robert Tibshirani, and Jerome Friedman - The Elements of Statistical Learning: Data Mining, Inference, and Prediction - Springer, 2nd ed

U4.4: Data Science

Business Intelligence (BI)

Module designation	**Data Science**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.4
Subtitle, if applicable	
Courses, if applicable	**Business Intelligence (BI)**
Semester(s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Mr. Nassim Bahri
Language	English
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours practical workshop in Lab/ semester 21 hours of Supervised projects on Campus/ semester
Workload	Total 84 hours/ Semester (42 hours of Self Study)
Credit points	3
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Object Oriented Design Database and SQL fundamentals
Module objectives/intended learning outcomes	**Objectives:** The objective of this course is to equip students with the knowledge and practical skills to design, implement, and use Business Intelligence (BI) solutions. The course focuses on the principles of data warehousing, data modeling, ETL processes, and data visualization, with hands-on experience using Power BI for dashboard creation and data analysis. **Learning outcomes:** By the end of this course, students will be able to: • Understand the role of BI and data warehousing in business decision-making • Design and implement a data warehouse using dimensional modeling techniques • Perform ETL operations and prepare data for analytics • Use Power BI to connect, clean, and model data • Create dynamic and interactive reports and dashboards • Analyze and communicate data insights effectively using visualizations

Content	**Chapter 1: Introduction to Business Intelligence** • BI concepts, architecture, and value in decision-making • OLTP vs. OLAP systems **Chapter 2: Data Warehousing Fundamentals** • Data warehouse design principles (Inmon vs. Kimball) • Star and snowflake schemas **Chapter 3: ETL Process (Extract, Transform, Load)** • Data integration and transformation • Tools and techniques for ETL **Chapter 4: Dimensional Modeling** • Fact tables, dimension tables, surrogate keys • Slowly Changing Dimensions (SCD) **Chapter 5: Introduction to Power BI** • Connecting data sources • Data transformation using Power Query **Chapter 6: Data Modeling and DAX in Power BI** • Relationships, measures, calculated columns • Introduction to DAX formulas **Chapter 7: Building Interactive Dashboards** • Designing reports and dashboards • Filters, slicers, drilldowns
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%) (Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1. Ralph Kimball & Margy Ross – The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, Wiley 2. Cindi Howson – Successful Business Intelligence: Unlock the Value of BI & Big Data, McGraw-Hill 3. Alberto Ferrari & Marco Russo – The Definitive Guide to DAX, Microsoft Press 4. Microsoft Learn – Power BI Documentation – https://learn.microsoft.com/en-us/power-bi/

U4.5 Languages and Management II

Business Management

Module designation	**Languages and Management II**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.5
Subtitle, if applicable	
Courses, if applicable	**Business Management**
Semester(s) in which the module is taught	Semester4
Person responsible for the module	Dept Head
Lecturer	Ms. Yosra Saidi
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of Classroom Lecture/ Semester
Workload	Total 42 hours/ Semester (21hours of Self Study)
Credit points	1.5
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	
Module objectives/intended learning outcomes	**Objectives:** This course has three main objectives: - Allow the student to know the company and the nature of its relationship with the environment. - Introduce him to the fundamental principles of management and management - Prepare him for the various management specialties (Marketing, Finance, Production Management, Management, Human Resources Management).
Content	**Chapter 1: management and the manager** 1. Management 2. The manager 3. The evolution of management **Chapter 2: The Company** 1. Definition 2. The role of the Company 3. The different shapes

	Chapter 3: The business environment 1. Definition 2. Dimensions of the environment 3. ESE-Envt interactions and its evaluation **Chapter 4: Business functions** **1.** Supply management 2. Production management 3. The marketing function 4. Financial management **Practical activities:** **Competency approach or framework**
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1. Zouaoui M. et Karoui S. (1999): Le management, processus de gestion et fonctions de l'entreprise, Editions Clés. 2. KorbiK. (2006) : Introduction à la gestion, centre de publication universitaire. **3.** Kotler et Dubois (2002) : Marketing management, Dunod.

U4.5 Languages and Management II

English TOIEC II

Module designation	Languages and Management II
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.5
Subtitle, if applicable	
Courses, if applicable	English TOEIC II
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	
Lecturer	Ms. Nadia Zardi
Language	English
Relation to curriculum	Integrated course module
Type of teaching, contact hours	42 hours Lecture/ semester
Workload	Total 77 hours/semester (35 hours of Self-Study/semester)
Credit points	1.5
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	General English, English TOEIC 1
Module objectives/intended learning outcomes	**Objectives:** 1. Pass the TOEIC test 2. Grasp most of all listening and reading tactics **Learning Outcomes:** Students will be able to: 1. Demonstrate how well they understand spoken English. 2. Focus on their learning, think actively, monitor their comprehension of different types of texts and demonstrate appropriate reading strategies.

Content	**Classroom Lecture (Continue from Semester 3)** **Part I: Listening** **Chapter 1. Photographs** Distractor 1: Sound Confusion Distractor 2: Verb/Noun Confusion Distractor 3: Non-Itemed Pictures Distractor 4: Action /State confusion **Mini Test** **Chapter 2. Question and Response** Distractor 1: Repeating words Distractor 2: Related words Distractor 3: Wrong Subject Distractor 4: Wrong Tense Answering Wh-Questions with Yes or No Distractor 5: Negative Questions Distractor 6: Tag Questions **Mini Test** **Chapter 3. Conversations (two or more speakers)** Distractor 1: Topic Questions Distractor 2: Detail Questions Distractor 3: Inference Questions Distractor 4: Types of situations **Mini Test** **Chapter4. Talks (one single speaker)** Distractor 1: Topic Questions Distractor 2: Speaker/Audience Questions Distractor 3: Detail Questions Distractor 4: Types of Talks **Mini Test** **Part II. Reading** **Chapter 1. Incomplete Sentences** Vocabulary Based Items

	Grammar Based Items **Mini Test** **Chapter 2. Text Completion** Grammar Concepts **Mini Test** **Chapter 3. Reading Comprehension** Question Types Passage Types Multiple passage Items **Mini Test**
Study and examination requirements and forms of examination	Continuous assessment through mini test A common test for all types of Engineering by the end of each semester Listening Exam (Semester I): 100 questions /multiple choice: 45minutes. Listening and Reading Exam (Semester II): 200 questions/ multiple-choice 120 minutes.
Media employed	Textbook/ hard copies for Classroom
Reading list	1. Dooley, J. (2019). Prepare and Practice for the TOEIC Test. Express Publishing. 2. G rant, T. (2007). Tactics for Toeic. Oxford University Press

U4.6 Project

End of Year Project

Module designation	**Project**
Module level, if applicable	Year 2, Semester 2
Code, if applicable	U4.6
Subtitle, if applicable	
Courses, if applicable	**End of Year Project**
Semester (s) in which the module is taught	Semester 4
Person responsible for the module	Dept Head
Lecturer	Departments teaching staff members
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of Supervision on Campus/ semester
Workload	Total 63 hours/semester (42 hours of Self-Study/semester)
Credit points	2
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Software Programming and Design/Scientific Writing
Module objectives/intended learning outcomes	This exercise will help student to apply knowledges and Skills to work and present a basic project. **Objectives:** 1. Sizing and choice of solution 2. Project studies: functional and structural analysis, design (preparation of technical files) 3. Design Simulation using appropriate software & tools 4. Write a project report and do a presentation **Learning Outcomes:** Students will be able to: 1. Know how to manipulate a project through his steps. 2. Cooperate and work in teams.

Content	**List of Projects 2023-2024** **Development of Applications** **Project 1: Personalized Learning Recommendation System** Build a system that recommends personalized study plans or resources to students based on their strengths, weaknesses, and learning styles. Key Concepts: • Reinforcement learning for personalized pathways, • User profiling and clustering, • Predictive analytics. **Project 2: Fake News Detection System** Develop a machine learning model that detects whether an article or social media post is real or fake. Key Concepts • Natural Language Processing (NLP), • Text classification with deep learning (BERT, RoBERTa), • Data cleaning and feature extraction. **Project 3: AI-based Medical Diagnosis Assistant** Create a system that assists doctors by analyzing symptoms and medical images to suggest possible diagnoses. Key Concepts: • Medical image classification (X-rays, MRIs), • Multi-label classification, • Explainable AI (XAI) for transparent decision making. **Project 4: Emotion Recognition from Speech and Video** Build a multi-modal AI model that can detect human emotions through voice tone and facial expressions. Key Concepts: • Audio feature extraction (MFCCs, spectrograms), • Video-based emotion recognition (CNNs, RNNs), • Fusion models (combining audio and video).

	Project 5: Self-Learning Chatbot (Deep Reinforcement Learning) Create a chatbot that improves its responses through user feedback without predefined rules. Key Concepts: • Deep Q-Learning (DQN), • Policy optimization, • Reward function design based on user satisfaction.
Study and examination requirements and forms of examination	Work carried out during the year (20%) + Prototype realization (30%) + Evaluation of the final report of project (50%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	Document and references are given by supervisors depending on each project