BACHELOR IN MATHEMATICS, OPTION: DATA SCIENCE

Main Language of Instruction:
French ○ English ☑ Arabic ○

Campus Where The Program Is Offered: CST, CLN, CLS, CZB

OBJECTIVES

Data science is a scientific field at the interface between mathematics and computer science. Our program covers the following areas: programming and data analysis for managing and engineering big data and mathematical tools as probability and statics to analyze and interpret data. Moreover, we provide courses on artificial intelligence and machine learning to extract insights from data and support decision-makers.

PROGRAM LEARNING OUTCOMES (COMPETENCIES)

1) Apply various mathematical techniques for processing problems related to massive quantities of data.
2) Write computer programs in languages suitable for data science to collect, clean, and analyze data.
3) Communicate the results of data analysis in oral, written, and visual form to both technical and non-technical audiences.
4) Advocate for ethical decisions in the use of data.

PROGRAM REQUIREMENTS

180 credits: Required courses (144 credits), Institution's elective courses (30 credits), Open elective courses (6 credits).
USJ General Education Program (32 credits - may be part of the above categories).

Fundamental Courses (152 Cr.)
Required Courses (144 Cr.)
Advanced Programming with C++ (6 Cr.), Applied Linear Algebra (6 Cr.), Artificial Intelligence (4 Cr.), Big Data Frameworks (4 Cr.), Calculus I (6 Cr.), Calculus II (6 Cr.), Calculus III (6 Cr.), Computer Programming I (6 Cr.), Computer Programming II (6 Cr.), Data Mining (6 Cr.), Data Protection (2 Cr.), Data Structures and Algorithms (4 Cr.), Data Visualization (6 Cr.), Descriptive Statistics (4 Cr.), Discrete Mathematics (4 Cr.), Ethics for Data Science (2 Cr.), Foundations of Data Science (4 Cr.), Introduction to Natural Language Processing (4 Cr.), Introduction to Programming with C++ (4 Cr.), Lab for R (4 Cr.), MATLAB for Data Science (4 Cr.), Matrix Computations (6 Cr.), Probability for Data Science (6 Cr.), Project Management (6 Cr.), Projects in Data Science (6 Cr.), Relational Databases (6 Cr.), Statistical Analysis of Data (6 Cr.), Statistics for Data Science (6 Cr.), Web Application (4 Cr.)

Institution's Elective Courses (12 Cr.)
3 Courses to be chosen from the following list:
Business and Professional Communication (4 Cr.), Internet Programming (4 Cr.), Introduction to Economics (4 Cr.)

Open Elective Courses (6 Cr.)
Arabic (4 Cr.)
Two courses to be chosen from the list of courses offered in Arabic (see USJ General Education Program)
Other (2 Cr.)
A course to be chosen from the following list of electives available at the university (sports, Chinese, etc.)

USJ General Education Program (32 credits)
English (4 Cr.) (Required)
English Level A (4 Cr.)

Arabic (4 Cr.) (Open Electives)
- **Arabic Language and Culture (2 Cr.)**
  - One course to be chosen from the following list:
  - Arabic Language and the Media (2 Cr.)
  - Arabic Language and the Art (2 Cr.)
- **Courses taught in Arabic (2 Cr.)**
  - One course to be chosen from the following list:
  - Basic Pre-Rescue First Aid (2 Cr.)
  - Self-Expression Through Music (2 Cr.)
  - Theater and Self-Discovery (2 Cr.)

Humanities (8 Cr.) (Closed Electives)
- **Ethics (2 Cr.)**
  - One course:
  - Ethics for Data Science (2 Cr.)
- **Religious Sciences (2 Cr.)**
  - USJ Values in Daily Life (2 Cr.)
- **Civic and Citizen Engagement (2 Cr.)**
  - One course to be chosen from the following list:
  - Active Citizenship: Strategy and Techniques (2 Cr.)
- **Other (4 Cr.)**
  - Two courses to be chosen from the following list:
  - Origin of Scientific Concepts (2 Cr.)
  - Scientific Journalism (2 Cr.)
  - The World, Current Events, and Me (2 Cr.)
  - Law in Everyday Life (2 Cr.)
  - Sustainable Development (2 Cr.)

Social Sciences (6 Cr.) (Open Electives)
- **Professional Integration and Entrepreneurship (2 Cr.)**
  - One course to be chosen from the following list:
  - Successful Job Hunting (2 Cr.)
  - Entrepreneurship (2 Cr.)
  - Work Ready Now (2 Cr.)
- **Other (4 Cr.)**
  - Two courses to be chosen from the following list:
  - Designing Business Models (2 Cr.)
  - Time and Money Management (2 Cr.)
  - Social Leadership (2 Cr.)
  - Sociology of Emotions (2 Cr.)

Communication Techniques (4 Cr.) (Required)
- Business and Professional Communication (4 Cr.)

Quantitative Techniques (6 Cr.) (Required)
- Probability for Data Science (6 Cr.)

USJ General Education Program (CLN)

English (4 Cr.) (Required)
- English Level A (4 Cr.)

Arabic (4 Cr.) (Open Electives)
- **Arabic Language and Culture (2 Cr.)**
  - One course to be chosen from the following list:
  - Arabic Language and the Media (2 Cr.)
  - Arabic Language and the Arts (2 Cr.)
- **Courses taught in Arabic (2 Cr.)**
  - One course to be chosen from the following list:
  - Self-Expression Through Music (2 Cr.)
  - Theater and Self-Discovery (2 Cr.)
- **Humanities (8 Cr.) (Closed Electives)**

Ethics (2 Cr.)
One course:
Ethics for Data Science (2 Cr.)
Religious Sciences (2 Cr.)
USJ Values in Daily Life (2 Cr.)
Civic and Citizen Engagement (2 Cr.)
One course to be chosen from the following list:
Volunteer and Civic Engagement (2 Cr.)
History of Lebanese Theater (2 Cr.)
Doubt and Truth: A Critical Reading of Facts (2 Cr.)
Other (2 Cr.)
One course to be chosen from the following list:
Origin of Scientific Concepts (2 Cr.)
Scientific Journalism (2 Cr.)
The World, Current Events, and Me (2 Cr.)
Social Sciences (6 Cr.) (Open Electives)
Professional Integration and Entrepreneurship (2 Cr.)
One course to be chosen from the following list:
Successful Job Hunting (2 Cr.)
Entrepreneurship (2 Cr.)
Work Ready Now (2 Cr.)
Other (4 Cr.)
Two courses to be chosen from the following list:
Political Culture (2 Cr.)
Panorama of the Lebanese Economy 1 (2 Cr.)
Panorama of the Lebanese Economy 2 (2 Cr.)
Communication Techniques (4 Cr.) (Required)
Business and Professional Communication (4 Cr.)
Quantitative Techniques (6 Cr.) (Required)
Probability for Data Science (6 Cr.)

USJ General Education Program (CZB)
English (4 Cr.) (Required)
English Level A (4 Cr.)
Arabic (4 Cr.) (Open Electives)
Arabic Language and Culture (2 Cr.)
One course to be chosen from the following list:
Arabic Language and the Media (2 Cr.)
Training in Christian-Muslim Dialogue (4 Cr.)
Courses taught in Arabic (2 Cr.)
One course to be chosen from the following list:
Basic Pre-Rescue First Aid (2 Cr.)
Self-Expression Through Music (2 Cr.)
Theater and Self-Discovery (2 Cr.)
Humanities (8 Cr.) (Closed Electives)
Ethics (2 Cr.)
One course:
Ethics for Data Science (2 Cr.)
Religious Sciences (2 Cr.)
USJ Values in Daily Life (2 Cr.)
Civic and Citizen Engagement (2 Cr.)
One course to be chosen from the following list:
Introduction to Ethics (4 Cr.)
Women Leadership (2 Cr.)
Artificial intelligence in Business – the Ethics (4 Cr.)
Volunteer and Civic Engagement (2 Cr.)

Other (2 Cr.)
One course to be chosen from the following list:
Corporate Culture and Ethics (2 Cr.)
Personal Development and Organizational Behavior (2 Cr.)
Social Sciences (6 Cr.) (Open Electives)
Professional Integration and Entrepreneurship (2 Cr.)
One course to be chosen from the following list:
Entrepreneurship and Innovation (2 Cr.)
Fundamental Management Skills (4 Cr.)
Labor Law and Social Security (2 Cr.)
Labor Law (2 Cr.)
Other (4 Cr.)
Two courses to be chosen from the following list:
Decision-Making (4 Cr.)
Career Coaching and Personal Branding (4 Cr.)
Leadership, Negotiation and Decision-Making (4 Cr.)
Talent Management and Leadership: A Strategic Challenge (4 Cr.)
Communication Techniques (4 Cr.) (Mandatory)
Business and professional communication (4 Cr.)
Quantitative Techniques (6 Cr.) (Mandatory)
Probability for Data Science (6 Cr.)
USJ General Education Program (CLS)
English (4 Cr.) (Required)
English Level A (4 Cr.)
Arabic (4 Cr.) (Open Electives)
Arabic Language and Culture (2 Cr.)
One course to be chosen from the following list:
Arabic Language and the Media (2 Cr.)
Courses taught in Arabic (2 Cr.)
One course to be chosen from the following list:
Basic Pre-Rescue First Aid (2 Cr.)
Graphic Design (2 Cr.)
Training in Christian-Muslim Dialogue (4 Cr.)
Humanities (8 Cr.) (Closed Electives)
Ethics (2 Cr.)
One course:
Ethics for Data Science (2 Cr.)
Religious Sciences (2 Cr.)
USJ Values in Daily Life (2 Cr.)
Civic and Citizen Engagement (2 Cr.)
One course to be chosen from the following list:
Volunteer and Civic Engagement (2 Cr.)
Training in Christian-Muslim Dialogue (4 Cr.)
Other (2 Cr.)
One course to be chosen from the following list:
Non-Violent Communication (2 Cr.)
Social Sciences (6 Cr.) (Open Electives)
Professional Integration and Entrepreneurship (2 Cr.)
One course to be chosen from the following list:
Entrepreneurship and Innovation (2 Cr.)
Other (4 Cr.)
Two courses to be chosen from the following list:
Work Ready Now (4 Cr.)
Communication Techniques (4 Cr.) (Required)
Business and Professional Communication (4 Cr.)
Quantitative Techniques (6 Cr.) (Required)
Probability for Data Science (6 Cr.)

SUGGESTED STUDY PLAN

Semester 1

Code	Course Name	Credits
048CA1DL1	Calculus I	6
048CP1DL1	Computer Programming I	6
048DSTDL1	Descriptive Statistics	4
048DIMDL1	Discrete Mathematics	4
048FDSDL1	Foundations of Data Science	4
	Open Elective – Arabic	2
	GEP – Humanities	4
	Total	**30**

Semester 2

Code	Course Name	Credits
048LA1DL2	Applied Linear Algebra	6
048CA2DL2	Calculus II	6
048CP2DL2	Computer Programming II	6
048DAPDL2	Data Protection	2
048ETHDL2	Ethics for Data science	2
048INPRDL2	Internet Programming	4
	GEP – Arabic	4
	Total	**30**

Semester 3

Code	Course Name	Credits
048BPCDL3	Business and Professional Communication	4
048CA3DL3	Calculus III	6
048PRCDL3	Introduction to Programming with C++	4
048PRODL3	Probability for Data Science	6
048RDADL3	Relational Databases	6
	GEP – Arabic	2
	GEP – Humanities	2
	Total	**30**

Semester 4

Code	Course Name	Credits
048APCDL4	Advanced Programming with C++	6
048DSADL4	Data Structures and Algorithms	4
048RLADL4	Lab for R	4
048MCADL4	Matrix Computations	6
048STADL4	Statistics for Data Science	6
	GEP – Arabic	2
	GEP – Humanities	2
	Total	**30**

Semester 5

Code	Course Name	Credits
048ARIDL4	Artificial Intelligence	6
048DMIDL5	Data Mining	6
048DVIDL5	Data Visualization	4
048ANGLL5	English - Level A	4
048SADDL5	Statistical Analysis of Data	6
048ECODL5	Introduction to Economics	4
	Total	**30**

Semester 6

Code	Course Name	Credits
048BDFDL6	Introduction to Big Data	4
048NLPDL6	Introduction to Natural Language Processing	4
048MDSDL6	MATLAB for Data Science	4
048PRMDL6	Project Management	4
048PDSDL6	Projects in Data Science	6
048WEBDL6	Web Application	6
	GEP – Social Sciences	2
	Total	**30**

COURSE DESCRIPTION

048APCDL4 Advanced Programming with C++ 6 Cr.

This course provides a comprehensive exploration of Object-Oriented Programming (OOP) principles within the context of the C++ programming language. Students will delve into the following key topics: fundamental principles of OOP; classes and objects in C++; constructors and destructors; access modifiers and controlled access; inheritance and polymorphism; virtual functions and abstract classes. By the end of this course, students will possess a strong foundation in OOP principles and practical skills in using C++ to design and implement efficient, modular, and maintainable software applications.

048LA1DL2 Applied Linear Algebra 6 Cr.

This course provides a modern elementary introduction to linear algebra and a broad selection of interesting applications. This modern approach reflects the ways data science and engineers use linear algebra in practice. The topics covered in this course are: Systems of linear equations, matrices, linear programming, determinants, vector spaces, inner product spaces, eigenvalues and eigenvectors, linear transformations, and numerical methods.

048ARIDL4 Artificial Intelligence 4 Cr.

This course introduces the fundamental concepts and techniques underlying the construction of intelligent computer systems. Topics covered in the course include intelligent agents, problem solving and searching algorithm, game design, reasoning and decision making in the presence of uncertainty, machine learning, logic and knowledge representation, planning.

048BPCDL3 Business and Professional Communication 4 Cr.

This course offers students the knowledge of essential basic rules of main ways of communication (written, verbal and non-verbal). It provides tools and strategies to help them integrate the professional life, making them aware of the errors to be avoided. This course is divided into two sections. Section one is designed to introduce students

to the art and science of creating visually appealing presentations. In section two, students will acquire and enhance essential communication skills for academic and professional activities. The course provides theoretical knowledge and strategic communication techniques to effectively interact in various exchange situations, whether with individuals or mass audiences. Students will also learn to strategically use various communicative tools to create communication strategies that are adapted to the context and audience. The interactive course aims to develop students' skills as communicators and orators, enabling them to influence their peers and succeed in both their academic and professional endeavors.

048CA1DL1 Calculus I 6 Cr.

The objective of this course is for students to gain proficiency in calculus computations.
Upon successful completion of this course, students will be able to: Compute limits, derivatives, and integrals; Analyze functions using limits, derivatives, and integrals; Recognize the appropriate tools of calculus to solve applied problems.
Students will use these analytical tools to solve application problems in a variety of settings ranging from physics and biology to business and economics.

048CA2DL2 Calculus II 6 Cr.

Upon successful completion of this course, students will be able to: Model and solve problems using sequences and series; Learn an exhaustive range of discrete structures for data scientists; Program MATLAB package designed for computations pertaining to sequences, series, and parametric and polar curves; Approximate a function around a point (Taylor & Maclaurin); Evaluate limits, continuity and differentiability of multivariable functions; Identify local and absolute extrema of a simple surface; Analyze and interpret parametric equations; Convert from Cartesian to polar coordinates; Analyze 3-D geometric figures.

048CA3DL3 Calculus III 6 Cr.

This course introduces students to advanced calculus concepts, focusing on partial derivatives, multiple integrals, line integrals, and second-order differential equations. Emphasis is placed on both theoretical understanding and practical applications in various fields.

048CITBL1 Active Citizenship: Strategy and Techniques 2 Cr.

This course is designed for students of the Faculty of Science to enable them to engage in a civic experience and explore various forms of civic practices in Lebanon and around the world.

048CP1DL1 Computer Programming I 6 Cr.

The aim of this course is to introduce students to the concepts of algorithms and programming using pseudocode and the Python language. Upon successful completion of this course, students will be able to: Design an algorithm to solve a specific problem; Translate pseudocode to computer programs using Python language; Execute and debug a computer program using Python language.

048CP2DL2 Computer Programming II 6 Cr.

The aim of this course is to learn how to write simple to complex programs using the Python language.
Upon successful completion of this course, students will be able to: Write a Python program to solve a mathematical problem; Choose the appropriate data structure to store data; Analyze data using Python specific libraries.

048DMIDL5 Data Mining 6 Cr.

This course provides an in-depth exploration of key data mining concepts and techniques, equipping students with the skills to extract valuable insights from data. Students will learn about data preprocessing, association rules, classification methods, clustering, and support vector machines through both theoretical study and hands-on implementation.

048DAPDL2 Data Protection 2 Cr.

The objective of this course is to present good reflexes of personal data protection for data science students. Upon the successful completion of this course, students will be able to: Understand the key terms used in data protection topics; Comprehend their roles and responsibilities under the General Data Protection Regulation (GDPR) and the Data Protection Act (DPA) 1998; Identify data protection principles that all organizations must adhere to; Recognize the lawful grounds for processing personal data; Understand the importance of risk management and implement it using a specific framework; Learn the different techniques used to protect personal data.

048DSADL4 Data Structures and Algorithms 4 Cr.

This course introduces fundamental concepts of data structures and algorithms using the C++ programming language. Students will learn about pointers, recursion, algorithmic complexity, various sorting methods, linked lists, stacks, queues, and binary trees.

048DVIDL5 Data Visualization 6 Cr.

This course introduces students to the fundamental principles and techniques of data visualization. Through hands-on exercises and projects, students will learn how to create effective visualizations using various chart types and tools.

048DSTDL1 Descriptive Statistics 4 Cr.

The objective of this course is for students to learn how to use the statistical concept essential for data science. The notions acquired will be used in a practical way in their work during the collection, analysis and interpretation of data. At the end of this course, students will be able to: Calculate measures of central tendency and measures of dispersion and interpret their meaning; Organize data in frequency tables and present them using many graphs; Use descriptive and deductive statistical methods to study the association between two numerical variables (linear regression) and to analyze their correlation.

048DIMDL1 Discrete Mathematics 4 Cr.

The main objectives of the course are to: Introduce concepts of mathematical logic for analyzing propositions and proving theorems; Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described; Use sets for solving applied problems, and algebraically use the properties of set operations; Investigate functions as relations and their properties; State and use the Quotient-Remainder Theorem (Division Algorithm) and construct divisibility arguments; Apply the Euclidian Algorithm.

048DBMML6 Designing Business Models 2 Cr.

A quick google search of the term "Design Thinking" will trigger thousands and thousands of articles, pictures and use cases for you to explore. The reason why this term boomed in the past decade is because, essentially, it is how successful products are made.
Design Thinking is a framework used to solve business problems by going through 5 main iterative phases:

- Discovery: gathering information around stakeholders, user pain points, business requirements, etc.
- Definition: re-framing the problem that is wide enough out-of-the-box thinking, and at the same time focused enough to meet business needs.
- Ideation: exploring different ways to address the problem and meeting the user's needs.
- Prototype: producing a low-fidelity version of the product/service/etc. that doesn't require imagination to visualize the solution.
- Testing: gathering feedback from target users on the prototype to understand what works and what needs to be modified.

048ANGLL5 English - Level A 4 Cr.

This course is designed to develop critical thinking, reading, oral and writing skills. It focuses on synthesizing sources, producing a research paper and defending it in front of an audience. Emphasis is on the analytical reading of different text types required in the disciplines as well as on synthesis from a variety of sources to produce a written text and present it orally.

048ENTML6 Entrepreneurship 2 Cr.

In the fast-evolving world that we are experiencing in our daily life, mostly the work environment, where traditional career paths are being redefined by innovation and technology, it is important for students to be exposed to the fundamentals of entrepreneurship, and include the entrepreneur mindset in today's generation.
Therefore, students should receive the right education and support from the institutions.
In addition, students have the right to be exposed and to learn that they have other paths than the traditional way.

048ETHDL2 Ethics for Data Science 2 Cr.

This course delves into the ethical considerations and responsibilities that data scientists face in their work. Students will explore various ethical frameworks, analyze real-world case studies, and engage in discussions to develop a comprehensive understanding of ethical decision-making in the context of data science.

048FDSDL1 Foundations of Data Science 4 Cr.

The objective of this course is to introduce students to the data science toolkit and its core concepts.
Upon successful completion of this course, students will be able to: understand data science terminology, experiment with data science tools for data analytics, big data, etc., and become familiar with the concept of No-SQL databases. To support the learning objective, the coursework will include exercises and resources in which students will face and solve real-world problems.

048INPRDL2 Internet Programming 4 Cr.

This course is designed for beginners who want to learn the basics of web development with HTML and CSS. Students will learn how to create a basic web page layout, format text, add images, links, and lists using HTML tags, and apply styles and layouts using CSS. By the end of the course, students will have the foundational skills to create simple web pages.

048BDFDL6 Introduction to Big Data 4 Cr.

This course aims to explore the Big Data world by understanding all the technical components and aspects, through the study of the top frameworks and databases by learning and practicing in multiples scenarios and applications.

048ECODL5 Introduction to Economics 4 Cr.

This course provides students with a foundation in microeconomic and macroeconomic principles, focusing on understanding the behavior of contemporary economies. The course employs economic models and graphical tools to illustrate how supply, demand, and macroeconomic aggregates influence economic outcomes.

048NLPDL6 Introduction to Natural Language Processing 4 Cr.

The course on Natural Language Processing (NLP) is designed to equip students with a comprehensive understanding and practical skills in working with human language data.

048PRCDL3 Introduction to Programming with C++ 4 Cr.

This course introduces the basics of programming using the C++ language. Students will learn about variables, control structures, functions, and arrays, with a focus on practical application through hands-on coding exercises. By the end of the course, students should be able to: Write simple C++ programs, understand syntax, and debug code; Utilize variables, operators, and input/output operations; Apply conditional statements and loops to control program flow; Design and use functions, both predefined and user-defined; Manipulate arrays and work with multidimensional arrays; Understand basic string operations.

048JSCPL1 Scientific Journalism 2 Cr.

This course aims to teach students the basic techniques and rules of journalistic writing. By the end of this course, students will be able to understand the fundamental techniques of journalistic writing, assess the relevance of scientific information that could be published (information selection) in general media, and write both a news story and a scientific press article..

048RLADL4 Lab for R 4 Cr.

This course is designed to provide students with hands-on experience and proficiency in utilizing the R programming language for statistical analysis, data visualization, and data manipulation. Participants will engage in practical exercises and real-world applications to develop a comprehensive understanding of R's capabilities.

048DVQCL1 Law in Everyday Life 2 Cr.

This course aims to familiarize students with the basic concepts of law, providing a pedagogical introduction to an essential but seemingly daunting subject, especially for science students. The goal is to enable these students to understand current legal issues, know their basic rights and obligations as citizens, and understand their national legal system in relation to international law. Through examples, this course helps students locate and decipher legal texts, relevant references in legislation, or international conventions. Finally, also through example, this course ensures respect for the etymology of words and legal terminology.

048MAMPL1 The World, Current Events, and Me 2 Cr.

This course encourages students to reflect on the major issues affecting current events and shaking the country and the world. By analyzing the information that impacts them, the topics everyone is discussing, and those driving public debate, students will learn to develop critical thinking skills and express their viewpoints, especially during the ongoing health, economic, social, and political crises in Lebanon.

048VUQBL1 USJ Values in Daily Life 2 Cr.

This course aims to raise students' awareness of the core values of the Saint Joseph University of Beirut (USJ) and encourage them to integrate these values into their personal, interpersonal, and professional lives. It engages them in a critical reflection on how the values outlined in the USJ Charter can influence their behaviors, actions, and decisions in addressing contemporary challenges. Students will also become aware of global issues and ethical responsibilities, preparing them to positively contribute to building a better society.

048MDSDL6 MATLAB for Data Science 4 Cr.

The course equips students with the essential skills to leverage MATLAB's powerful numerical computation capabilities for data manipulation, analysis, machine learning, and model deployment in the field of data science. Through hands-on exercises, practical examples, and real-world projects, students will learn to access, preprocess, and visualize data, build machine learning models, and deploy them to enterprise systems using MATLAB. The course also delves into ethical considerations and emerging trends in data science, ensuring that students develop a holistic understanding of the subject.

048MCADL4 Matrix Computations 6 Cr.

This course provides a comprehensive understanding of numerical linear algebra, focusing on practical applications for computational scientists and engineers. Topics covered include fast transforms, parallel LU decomposition, discrete Poisson solvers, pseudospectra, structured linear equation problems, structured eigenvalue problems, large-scale singular value decomposition (SVD) methods, and polynomial eigenvalue problems.

048OCSCL1 Origin of Scientific Concepts 2 Cr.

This course aims to introduce students to the reflective analysis of the history of scientific disciplines and the origin and evolution of scientific concepts. It seeks to develop their critical thinking regarding the study of the connections between epistemology, the philosophy of science, and the history of science. The course also covers various epistemological currents and concepts that have shaped the construction of scientific knowledge. Understanding these elements is essential for grasping current scientific concepts in Biology, Chemistry, Physics, and Mathematics. The epistemological analysis of the development of scientific theories influences science education and the position of the scientific researcher.

048PRODL3 Probability for Data Science 6 Cr.

The main objective of this course is to equip students with the techniques required to analyze and explain random phenomena. After covering enumerative combinatorics, which constitute a benchmark to probability calculations, the concept of independent events is introduced. The course then delves into the study of random variables and the primary probability distributions including Bernoulli, binomial, Poisson, geometric, hypergeometric, uniform, Gaussian, and exponential distributions. Finally, the weak law of large numbers and the central limit theorem are discussed, providing students with a solid foundation for pursuing further statistics courses.

048PRMDL6 Project Management 6 Cr.

This course provides a comprehensive introduction to the principles and practices of project management. Students will learn the fundamental concepts, techniques, and tools required to initiate, plan, execute, monitor, and close projects successfully. Through case studies, group discussions, and practical exercises, students will develop the skills needed to manage projects across various industries.

048PDSDL6 Projects in Data Science 6 Cr.

The objective of the course is to allow students to put into practice the knowledge they have acquired throughout their training. This involves applying statistics and quantitative analysis, programming in R and in scripting (Python) or compiled (C++) languages to the processing of real data. At the end of the course, students will present a written report detailing the work they have brought.

048RDADL3 Relational Databases 6 Cr.

This course provides a comprehensive introduction to the fundamental concepts and practical applications of relational database systems. Through a combination of theoretical understanding and hands-on exercises, students will gain the knowledge and skills necessary to effectively design, create, query, and manage relational databases. The course covers various aspects of database management, including data modeling, SQL query language, normalization techniques, database administration, and data quality assurance. Additionally, students will explore advanced topics such as object-oriented databases, data warehousing, and the integration of database technologies.

048SADDL5 Statistical Analysis of Data 6 Cr.

This course offers a comprehensive introduction to statistical analysis techniques for data interpretation and decision-making. The course focuses on practical applications using the R statistical software. Students will gain the skills to analyze and interpret data, perform various statistical tests, and use advanced techniques for multivariate data analysis.

048STADL4 Statistics for Data Science 6 Cr.

The objective of this course is to provide data science students with an understanding of statistical concepts, including sampling, estimation using confidence intervals, hypothesis testing, regression, correlation analysis, goodness-of-fit tests and independence Chi-square tests.

048SOLBL2 Social Leadership 2 Cr.

Social leadership is a concept that refers to the emotional and empathetic style of leaders who prioritize connection, collaboration, and communication. These leaders recognize the significance of cultivating strong relationships within their teams and fostering a positive work environment.
Being a social leader involves knowing how to nurture trust, care, and respect within the team. Upholding these values enables team members to freely share ideas, fostering an open atmosphere an ever-changing work climate. In contrast to formal leaders, social leaders do not solely rely on position or title to achieve objectives. Instead, they leverage emotional intelligence and interpersonal skills to influence others. This approach enhances the effectiveness in today's workplace, where employees seek meaning and purpose in their work.
Upon completing this course, students will be able to:

- Identify the values and principles of social leadership.
- Develop essential skills for becoming a social leader.

- Define their purpose and guide their team on this same track.
- Understand the 9 core principles of the NET Model.
- Identify areas of strength and areas that need improvement.

048EMIPL2 Sociology of Emotions 2 Cr.

This course familiarizes students with the sociological theories of emotions, explores the impact of emotions on individual and collective decisions, and analyzes social interactions through the prism of emotions.

048SJHPL2 Successful Job Hunting 2 Cr.

The course aims to introduce students to professional life and its demands in terms of personal development and technical knowledge.

1. Responding to a job offer (application email, cover letter, CV)
2. How to attend a job interview (dress code; body language; how to present oneself; dos and don'ts; etc.)
3. Searching for a job offer (profile on LinkedIn; searching for offers on LinkedIn, Twitter; posting your CV on Monster, Bayt, etc.; searching for job offers on the websites of institutions, companies, hospitals, industries; etc.)

048SSDCL1 Sustainable Development 2 Cr.

This course aims to introduce students to the interconnectedness between various sectors of human life, sustainable development, and the Sustainable Development Goals (SDGs) established by the United Nations. It also aims to define the role of public and private entities in implementing these goals.

048TMMML2 Time and Money Management 2 Cr.

The Time and Money Management course aims to enlighten undergraduates about the choices to be made for extraordinary productivity. Moreover, this course enables students to have a clear understanding of various means of investments in several industries comprising: stock market, life insurance, private banking and retail banking.

048WEBDL6 Web Application 4 Cr.

This course is designed as an integral component of the Bachelor in Mathematics, option: Data Science program. It aims to equip students with the knowledge and skills necessary to develop robust and interactive web applications tailored for data science purposes

048WRNBL2 Work Ready Now 2 Cr.

The Work Ready Now program was developed to provide young students with the essential skills and knowledge needed to find and keep a job. This program, created by Higher Education Capacity Development (HECD), was designed in a participatory and practical manner so that students are actively involved in the learning process, gaining new skills and self-confidence to secure and maintain employment. Additionally, the learning methods allow students to develop digital skills through the use of free online software.

435LALML2 Arabic Language and the Media 2 Cr.

This course offers students the opportunity to explore the Arabic language and culture through an engaging and flexible approach. It introduces them to the use of Arabic in visual, audio, and written media, as well as in advertisements across these platforms. By doing so, it helps students develop practical language skills, both spoken and written, that they can apply in real-life situations.

435LALAL2 Arabic Language and the Arts 2 Cr.

This course offers students the chance to explore the Arabic language and culture in an engaging and flexible way. It introduces them to the use of Arabic in various visual arts, such as painting, calligraphy, and arabesque (Arabic ornamentation). Through this, students develop practical linguistic skills, both spoken and written, that are useful in real-life contexts.

048GESAL4 Basic Pre-Rescue First Aid 2 Cr.

Recognizing emergency situations, identifying first aid procedures, and initiating first aid care.

048EVMOL1 Self-Expression Through Music 2 Cr.

Choosing a selection of songs in various languages: Arabic, French, English, and Italian. The aim is to create a group project that motivates students to express themselves either through music or with their own words.

048TCSOL2 Theater and Self-Discovery 2 Cr.

The theater course is aimed at students interested in learning acting techniques in a fun and engaging environment. The sessions focus on dramatic arts exercises such as warming up, physical expression, relaxation, trust games, voice and breathing exercises, mime, improvisation, body rhythm, physical movements, motor skills, space management, stage presence, character development, and relaxation, concentration, and visualization techniques. The primary objective of this course is to help students develop and strengthen their stage presence (with "stage" referring to any performance space) and enhance their interaction with the audience in various types of performances, including lectures, seminars, and more. Students' stage practice is nurtured both individually and in groups. The teaching method emphasizes both the fun and discipline of play, engaging the body and voice as the actor's primary tools. It encourages students' creativity, prompting them to use their thinking, sensitivity, and imagination to respond to situations and explore different ways of delivering the text.

CLN

358DTVEL2 Doubt and Truth: A Critical Reading of Facts 2 Cr.

This course encourages students to develop a critical perspective and mindset, enabling them to analyze and interpret the events and circumstances around them. It allows them to analyze speeches and films, opening their eyes and minds by using philosophical social reading networks.

358CIACL4 Volunteer and Civic Engagement 2 Cr.

This course is designed to enable the development of a sense of civic leadership in USJ students and provide them with the necessary skills to help them successfully accomplish their mission. (1) Become familiar with the social and community context of your own environment. (2) Develop citizen leadership/change agent. (3) Acquire tools for managing citizen engagement projects.

358LEECL1 Panorama of the Lebanese Economy 1 2 Cr.

This course provides an overview of fundamental economic concepts, in order to understand how the Lebanese economic crisis arose. We will first introduce the political regime of "consociational democracy" to understand the roots of high levels of inequality in the Lebanese society. Second, we will present the results and conclusions of the World Bank's recent work on Lebanon's economic situation. Third, we will focus on three macroeconomic variables: gross domestic product (GDP), inflation and unemployment, which are key measures of a country's economic performance.

358PLE2L2 Panorama of the Lebanese Economy 2 2 Cr.

Lebanon and the International Monetary Fund (IMF) have reached a conditional agreement to release a $3 billion loan in April 2022 to help the country stem the worst economic crisis in its history. What should be done? To deal with all this chaos, the course provides and explains several solutions that can be implemented as a first step towards economic reforms and recovery: first, tackling inequality through progressive taxation; secondly, the negotiation between the Lebanese authorities and the IMF for an assistance and reform package; thirdly, the adoption of full dollarization or a currency board regime which could suit Lebanon to improve the quality of the national currency and guarantee the definitive end of the depreciation of the currency