

Main Language of Instruction:French ☐ English ☒ Arabic ☐**Campus Where the Program Is Offered:** CST

OBJECTIVES

While statistics were originally developed to support public decision-making by providing a precise description of economic, political, and social realities, they have since become essential for modern businesses, especially with the exponential proliferation of diverse data, commonly referred to as Big Data. Today, all professions and sectors increasingly require statistical skills, including engineering, management, economics, medicine and life sciences, physics, the Internet of Things (IoT), banking, start-ups, and industry, among others. However, making effective use of statistics requires specialized training to ensure proper and efficient application, as data analysis tools and methodologies have evolved significantly in recent years. The University Diploma in Applied Statistics aims to provide candidates with skills and specialization in the field of statistics. This program is designed for individuals who are required to perform statistical analyses as part of their work or research. It is worth 36 ECTS credits and is taught entirely in English.

PROGRAM LEARNING OUTCOMES (COMPETENCIES)

- Analyze and interpret complex data sets using appropriate statistical techniques.
- Utilize statistical software tools effectively for data modeling and analysis.
- Apply advanced statistical methods in a variety of fields, including business, healthcare, engineering, and other data-driven sectors.

ADMISSION REQUIREMENTS

The program welcomes candidates who hold at least a bachelor's degree in a relevant field, such as science, economics, finance, health, or other related disciplines. Admission is based on a comprehensive review of the candidate's application.

COURSES/CREDITS GRANTED BY EQUIVALENCE

At the request of the candidate, courses previously completed at another university or at a faculty of USJ other than the Faculty of Science may be recognized as equivalent to components of the University Diploma in Applied Statistics. This recognition is subject to review and approval by the USJ Equivalence Commission. The number of credits granted by equivalence may not exceed 50% of the total credits required for the program.

PROGRAM REQUIREMENTS

36 Credits: Required Courses (36 credits)**Required Courses (36 Cr.)**

Introduction to Probability (3 Cr.); Programming with Python (4 Cr.); Statistics with R (5 Cr.) Survey and Data Collection Techniques (3 Cr.); Regression Techniques (4 Cr.); Exploratory Data Analysis (4 Cr.); Biostatistics (3 Cr.); Time Series Analysis (4 Cr.); Storytelling with Data (3 Cr.); Introduction to Machine Learning (3 Cr.).



SUGGESTED STUDY PLAN

Code	Course Name	Credits
o48IPDUS1	Introduction to Probability	3
o48PPDUS1	Programming with Python	4
o48SRDUS1	Statistics with R	5
o48DCDUS1	Survey and Data Collection Techniques	3
o48RTDUS2	Regression Techniques	4
o48DADUS2	Exploratory Data Analysis	4
o48BIDUS2	Biostatistics	3
o48TSDUS2	Time Series Analysis	4
o48STDUS2	Storytelling with Data	3
o48MLDUS2	Introduction to Machine Learning	3
	Total	36

COURSE DESCRIPTION

o48IPDUS1	Introduction to Probability	3 Cr.
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This course offers an accessible introduction to the fundamental concepts of probability, with a focus on understanding and quantifying uncertainty in real-world contexts. Designed for candidates from diverse academic backgrounds, it emphasizes practical applications over formal mathematical derivations. Topics include basic probability rules, conditional probability, independence, random variables, key discrete and continuous distributions, expectation and moments, and the behavior of large data sets. Through this course, candidates will learn to apply core probability concepts in everyday and professional scenarios, model real-world phenomena using appropriate probability distributions, and interpret foundational principles such as the Laws of Large Numbers and the Central Limit Theorem. They will also be able to use expected values and measures of variability to support data-driven decision-making.

o48PPDUS1	Programming with Python	4 Cr.
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This course offers a beginner-friendly introduction to programming using Python, one of the most widely adopted languages in data science, business, and research. With no prior coding experience required, the course focuses on practical skills for automating tasks and managing data effectively. Candidates will learn to navigate Python's basic syntax and programming structures, manipulate data using lists and tables, organize code with functions and modules, and understand foundational object-oriented programming concepts. Additional topics include file handling, string processing, and an overview of key libraries for data analysis. At the end of the course, participants will be able to write clear and efficient Python scripts, work with various data structures, process and analyze data, automate routine operations, and apply best practices in code development for real-world applications.

o48SRDUS1	Statistics with R	5 Cr.
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This course introduces candidates to statistical analysis using R, with a balanced focus on descriptive and inferential statistics. Without requiring prior programming experience, candidates will learn to use R to organize, summarize, and interpret datasets in ways directly applicable to academic and professional settings. The course covers the creation of tables and graphical representations, computation of key statistical indicators (including measures of central tendency, dispersion, shape, and concentration), and analysis of categorical data through contingency tables. On the inferential side, candidates will gain hands-on experience with parameter estimation, confidence intervals, hypothesis testing, comparisons between samples, goodness-of-fit tests, and tests of independence. At the end of the course, candidates will be equipped to apply a wide range of statistical tools in R to extract meaningful insights from data and make informed decisions based on statistical evidence.

048DCDUS1	Survey and Data Collection Techniques	3 Cr.
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This course provides candidates with a practical foundation in survey methodology and data collection, emphasizing the critical role of reliable data in statistical analysis. Accessible to those with no prior experience in statistics, the course explores the essential steps of survey design and implementation through real-world examples. Candidates will learn how to construct clear and effective questionnaires, select appropriate measurement scales, and conduct pre-tests to refine their instruments. The course also covers various data collection methods, sampling techniques, sample size calculations, and strategies for ensuring data quality. At the end of the course, candidates will be able to design and conduct surveys effectively, apply suitable sampling methods, and implement quality control measures to produce robust and reliable datasets.

048RTDUS2	Regression Techniques	4 Cr.
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This course introduces candidates to essential regression models and variance analysis techniques, focusing on their application in real-world data analysis and prediction tasks. Designed to be accessible without an advanced mathematical background, the course equips candidates with the tools to understand relationships between variables and to model outcomes effectively. Topics include simple and multiple linear regression, analysis of variance (ANOVA), analysis of covariance (ANCOVA), generalized linear models (GLMs), logistic regression, and Poisson regression for count data and rare events. By the end of the course, candidates will be able to apply these models to a variety of contexts, interpret the results accurately, and integrate multiple regression techniques to conduct robust and insightful statistical analyses.

048DADUS2	Exploratory Data Analysis	4 Cr.
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This course introduces candidates to exploratory techniques for summarizing and structuring large datasets through factor analysis and unsupervised classification methods. Emphasizing practical applications, the course focuses on tools such as Principal Component Analysis (PCA), Correspondence Analysis (CA), and Multiple Correspondence Analysis (MCA) for dimensionality reduction and pattern detection, alongside clustering techniques to identify homogeneous groups within a population. Implemented in R and illustrated through real-world examples, these methods enable candidates to apply advanced multivariate techniques, analyze complex datasets, interpret meaningful patterns, and create effective visualizations that enhance understanding and communication of data insights.

048BIDUS2	Biostatistics	3 Cr.
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This course provides candidates with a comprehensive introduction to statistical methods used in health and biomedical sciences, with a strong emphasis on the analysis and interpretation of real-world health data. Building on prior statistical knowledge, candidates will explore epidemiological and clinical datasets to better understand research design, disease measurement, and outcome analysis. Topics include study designs, health indicators, diagnostic test evaluation, hypothesis testing, regression models such as linear, logistic, and survival analysis. The course also covers multivariate methods, statistical considerations in clinical trials, and health economic models. Through hands-on practice in R, candidates learn to apply appropriate techniques, assess risk measures, and support evidence-based decision-making, while also addressing ethical issues related to data use in medicine.

048TSDUS2	Time Series Analysis	4 Cr.
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This course equips candidates with the tools and techniques needed to analyze, interpret, and forecast time series data, i.e. datasets in which observations are ordered chronologically. Emphasizing practical applications across fields such as finance, economics, and environmental science, the course covers key concepts including trend and seasonality detection, visualization techniques, and model selection. Candidates will learn to apply core models such as ARMA and ARIMA, and explore advanced approaches like ARCH, GARCH, and Seasonal ARIMA to address volatility and seasonal effects. Forecasting methods and model evaluation strategies are also introduced, enabling candidates to generate reliable predictions and assess the performance of different time series models in real-world scenarios.

048STDUS2	Storytelling with Data	3 Cr.
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This course introduces candidates to the principles of effective data storytelling by merging analytical thinking with clear visual and narrative communication. Through a blend of conceptual guidance and hands-on practice using tools such as Excel, R, Tableau, and Power BI, candidates will learn how to tailor their message to diverse audiences, choose appropriate visual formats, and apply design principles that enhance clarity. The course covers key aspects such as identifying the audience, selecting the right charts, simplifying visuals, highlighting important patterns through design choices, and structuring persuasive data-driven narratives. Real-world case studies from business, healthcare, and social sciences illustrate how impactful storytelling can drive understanding and decision-making.

048MLDUS2	Introduction to Machine Learning	3 Cr.
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This course offers candidates a foundational introduction to machine learning, a key area of artificial intelligence that focuses on enabling computers to learn from data and improve their performance without explicit programming. Emphasizing practical applications, the course covers essential topics such as data preprocessing, supervised learning for regression and classification, unsupervised learning for clustering and pattern detection, and model evaluation techniques. Candidates will also explore introductory concepts in deep learning and neural networks. Through applied exercises and real-world examples, they will learn to build predictive models, assess their performance using appropriate metrics, and understand how machine learning can be leveraged across diverse domains.