INTENDED LEARNING OUTCOMES OF THE MASTER OF SCIENCE IN DATA SCIENCE AND BUSINESS ANALYTICS

CORE AREA OF STUDY

Knowledge and Comprehension

Graduates will acquire advanced knowledge related to:	Knowledge and Understanding will be achieved through the following courses:
1. Design and management of big databases, specifically: - Assessment of data quality and ability to scrape, cleanse, and de-dupe data - Mastering fundamentals of relational theory, SQL language, and relational algebra - Management of relational databases - Familiarity with infrastructures and distributed systems used to deal with them, such as Hadoop and MapReduce	2.1 Computer Programming and Database Systems
2. Data Science techniques related to: 2.1 Statistical learning, Bayesian statistics, classification trees, supervised and unsupervised machine learning, neural network 2.2 Econometric approaches that deal with the identification of causal relationships in big databases	2.1 Statistics and Probability; 2.1 Machine Learning 2.2 Econometrics for Big Data
3. The main strategic and marketing issues that a company faces, specifically: 3.1 Techniques to understand and monitor competition among firms 3.2 Marketing research analyses through Big Data and new product development process	3.1 Business Analytics 3.2 Innovation and Marketing Analytics

Ability to Apply Knowledge and Comprehension

Graduates will be able to:	Ability to Apply Knowledge and Understanding will be achieved through the following courses:
1. Apply acquired knowledge related to the creation and management of big databases in order to: - Effectively scrape data from different sources, including social networks like Twitter - Formulate a query in SQL or relational algebra - Design data for relational databases - Manage Big Data through Hadoop and MapReduce	1. Computer Programming and Database Systems
2. Master the main concepts in Data Science and Econometrics and apply them in order to: 2.1 Convert various problems of practical interest into statistical models and solve probabilistic problems, both theoretical and applied 2.2 Identify patterns, trends, correlations, and causal relationships in big databases	2.1 Statistics and Probability 2.1 Machine Learning 2.2 Econometrics for Big Data
3. Apply acquired knowledge to help firms and organizations make strategic decisions on the basis of the data analyzed, with a specific emphasis on: 3.1 Using integrated analytics to monitor competition among firms, predict future trajectories within the market, and identify emerging trends 3.2 Performing traditional marketing research analyses through Big Data	3.1 Business Analytics 3.2 Innovation and Marketing Analytics

BUSINESS ANALYTICS TRACK

Knowledge and Comprehension

Graduates will acquire advanced knowledge related to:	

1. Most advanced and relevant statistic and mathematical techniques for business purposes, specifically:
    1.1 Fundamental algorithms and mathematical models for processing natural language
    1.2 The fundamentals of neural networks applied to image analysis
    1.3 Mathematical methods of decision analysis and modelling
	1.1 Natural Language Processing
	1.2 Deep Learning for computer vision
	1.3 Simulation and Modeling

2. Use of statistical and mathematical techniques for Finance related to techniques for stochastic modeling and inferential statistical analysis, as applied in the field of finance as well as technical aspects of risk measurement and management in banking and insurance institutions	2. Finance with Big Data

Ability to Apply Knowledge and Comprehension

Graduates will be able to:	

1. Apply acquired knowledge in order to:
    1.1 Analyze unstructured data as it appears in web pages, tweets, product reviews, newspaper stories, social media, and financial statements, and perform sentiment analysis
    1.2 Analyze online and offline social networks data in order to e.g. provide product recommendations or identify influencers for marketing campaigns
    1.3 Model, simulate, and forecast the diffusion of new products and the emergence of new trends
	1.1 Natural Language Processing
	
	1.2 Social Network Analysis
	
	1.3 Simulation and Modeling

2. Apply acquired knowledge in order to help financial institutions to conduct financial risk forecasting, asset price valuation, and market predictions with Big Data	2.1 Finance with Big Data

DATA SCIENCE TRACK

Knowledge and Comprehension

Graduates will acquire advanced knowledge related to:	
1. Algorithms: - Fundamental principles of algorithm design and implementation of fundamental data structures - Analysis of algorithms in terms of their correctness, complexity (in time and in space), and tractability.	1. Computer Science (Algorithms)
2. Theory, algorithms, and applications of: 2.1 Optimization 2.2 Probabilistic theory and stochastic processes 2.3 Parametric and nonparametric models for prediction and classification:	2.1 Optimization 2.2 Stochastic Processes 2.3 Machine Learning II

Ability to Apply Knowledge and Comprehension

Graduates will be able to:	
1. Apply acquired knowledge in order to: - Solve a problem through the design, analysis and implementation of appropriate algorithms and data structures - assess and identify the most efficient algorithm to be used to analyze specific data	1. Computer Science (Algorithms)
2. Apply acquired knowledge in order to: 2.1 Perform optimization by using linear programming, network optimization, integer programming, and decision trees 2.2 Analyze and manipulate some classes of stochastic processes, compute the most relevant quantities of interest, and model stylized observed phenomena by choosing the correct type of process based on their characteristic 2.3 Perform several types of prediction/classification on big databases	2.1 Optimization 2.2 Stochastic Processes 2.3 Machine Learning II

CUSTOMIZED AND LINGUISTIC AREA OF STUDY

Knowledge and Comprehension

Regarding the "personalized" part of the study plan, graduates will acquire wide-ranging and in-depth knowledge related to specific topics of their choice, identified on the basis of individual interests and in line with the educational program.

Regarding languages, besides English (which is an entry requirement), graduates will acquire knowledge of another EU language (Italian: at least level A2; other EU language among those listed in the University Guide: at least level B1 business; Italian is compulsory for non-Italian native speakers).

Ability to Apply Knowledge and Comprehension

Graduates will be able to apply the methodologies acquired during the study program and use related practical tools; over time, they will be able to analyze and interpret the context of reference for issues related to the subjects of the study program and apply the logical methods acquired for tackling any new problems that may arise during their professional activity.

Regarding languages, besides English (language of the program) graduates will demonstrate abilities (written and oral comprehension and expression) in another EU language (at least elementary level; the exit level depends on the language – Italian or other EU language – and on the student's entry level).

Making Judgements
Graduates will acquire the ability to integrate knowledge, manage complexity and make judgements even with partial information, including considerations and assessments regarding decision making supported by big data.

Communications Skills
Graduates will acquire skills and tools appropriate for the management and transfer of information, both to specialists and non-specialists of the topic. In particular, they will be able to express themselves clearly and effectively in any setting. They will be able to make a presentation in public using the most modern IT tools.

Lifelong Learning Skills

Graduates will acquire learning skills that allow them to be autonomous in updating and developing their knowledge and competences related to data science and business analytics.