MASTER IN DATA SCIENCE FOR TRAVEL, TOURISM, AND CULTURE
LEVEL I – I EDITION
A.Y. 2017-2018

Presentation

The university Master's in Data science for travel, tourism and culture is a professional and personal development programme aimed at training people able to introduce and manage the most recent innovations in the digital economy into the travel, tourism and culture sector. The main attributes of the course are:
- development of individual capabilities and professional skills: students embark on a high level post-graduate training programme and career orientation process. The technical skills provided by the Master's will enable the student to manage and analyse large quantities of data for the purposes of providing essential elements for the design of new products and forms of fruition, new ways of analysing and managing demand in the tourism and cultural sector with its different types and profiles and new forms of communications and distribution; to contribute to creating new business opportunities for travel and tourism companies and organisations and institutions in the cultural sector; to support the organisation and coordination of the companies themselves - the course also develops top level management, modelling and problem-solving skills - a complete scenario of the corporate context in which the students will be working, the differences and logics guiding the various types of business in the sectors concerned and an awareness of the objectives of the data collection and processing, allowing students to interact effectively with managers in public and private tourism and cultural sector companies;
- the ability to manage project-based activities with a high level of autonomy;
- a connection with the world of work: the classroom contact with company testimonials, project development based on case studies, interviews and internships allow students to start building, or orienting, their career path;

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- an international perspective: a particular feature of the course will be the contribution of lecturers from the most prestigious foreign universities, the presence of students from other countries and the possibility of an internship abroad - a “hands-on data” approach. The Master’s will take the form of a permanent workshop where students will be invited to apply the knowledge acquired immediately to resolve case studies proposed from day one in collaboration with partner companies;
- a connection with research, enabling students to remain constantly up-to-date and focussed on the new orientations in the sector.

The Master's will include face-to-face and interactive lessons, company testimonials, project work, field activities, case studies and workshops.
The period of classroom learning will be followed by an internship in leading private and public companies in the sector to complete the high-level training offered by the Master's.

Aims
The Master's provides the computer skills required to manage and exploit large data bases for business development purposes. The programme also provides the skills necessary to contextualise and process the data with a view to business development, understanding and interacting with the customer and managing problem modelling, project solving and project management. Finally, the Master's also focuses on developing individual abilities and professional skills, with a programme firmly oriented towards the world of work.

Didactic activities

TEACHING 1
Travel, Tourism and Cultural Industries Management
The course includes four modules.

Module 1 – Travel&tourism industry and tourism destinations (Digital processes and multichannel distribution) provides the reference framework for the training program. It identifies the main stakeholders of the Travel&Tourism industry and of the tourism destinations (public bodies, firms and other private organisations), their roles and functions. It also presents the role of information systems in supporting the activities of this industry (back- and front-office). Starting from a set of basic concepts and definitions, this modules introduces the main elements characterizing the structure of the industries involved and the size and segmentation of the tourist markets (e.g., leisure vs. business tourism; cultural tourism). Furthermore, this module analyses in-depth the impact of digital innovation on the tourism sector as a whole and on the relationships among different actors. Finally, it presents the expected evolution of new business models. The main issues investigated and discussed in this module are: the digitalisation of the tourism value chain; the dynamics of mobile tourism and of e-commerce and social.
commerce in tourism; the evolution and impact of sharing economy; and the new applications of Artificial Intelligence and of Internet of Things in the Travel&Tourism industry.

**Module 2** - Main stakeholders: business models, activities and information flows - aims at helping students understand the business models, the activities and the “core” processes of the main stakeholders in the Travel&Tourism and cultural industries, in order to identify opportunities and threats linked to the management of data and information flows. Specifically, this module deals with and discusses the following topics: 1) the concept of Business Model and the business logic in different tourism and cultural sub-sectors: hospitality and Food&Beverage, travel intermediaries (e.g., tour operators, travel agencies, incoming operators, OTAs), transports and mobility (e.g., airlines, cruises, bus companies, port authorities, local transport companies, destination management (DMOs, public organisations), culture and events (e.g., museums, festivals). 2) the strategic and operational relationships among different stakeholders. This module includes also a number of seminars on specific information systems/platforms (e.g., PMS, CRM, channel manager). These seminars will be held by business professionals and representatives of main national and international tourism companies.

**Module 3** - Visitors, tourists and customers in the digital and social market: how to interconnect them - describes the clients’ decision making-processes and how they are managed by different information and booking systems platforms. It aim is to make the students individuate the main “touch points” where the tourists and tourism and cultural industries engage to exchange information provide service, or handle transactions. Specifically, this module deals with and discusses the following topics:

1) the decision-making process of the digital tourist: analysis of main steps (inspiration, planning, booking, experiencing, sharing, dreaming), identification of where and how they collect information, book services;
2) the main touch points and the relationships between different steps: what are the information searched by visitors and tourists and what those they provide to the market and to tourism and cultural industries;
3) tourism demand segmentation and profiling and the criteria to be used to analyse them: how innovation technologies, digitalization and social media change the traditional consumer behaviour (“tell me the information channel you use and I'll tell you what kind of tourist you are”) and/or support the rise of new behaviour (hybrid consumer);
4) multichannel promotion and distribution (e.g., web vs. app; standard vs. mobile);
5) customer engagement, customer care and post-experiences services (as output); 6) self-booking tools and travel policies for the business travel market;
7) Door-to-Door trip and customer care along the whole decision-making process;
8) Data intelligence and forecasts for business management. This module includes also a number of seminars held by business professionals and representatives of the main national and international companies.

**Module 4** - English for tourism digital management - provides the students with a thesaurus of acronyms and tecnica terms/expressions commonly used in the Travel&Tourism industry, in the world of digital tourism and, more generally, in data analytics, ecommerce and web marketing. N.B. The lecturer or professor indicated as responsible of each module is in charge of planning and coordinating the modules’ lectures. Lectures will be held by different lecturers and professors, including the responsible of the module.
TEACHING 2

Mathematics and Statistics

This course includes three modules:

Module 1 - Introduction to Data Science: tools and methods: it is an introductory module to data science, providing the basics and the general framework of Data Science, a subject that will be then dealt with deeply in the advanced modules.

Specifically, this module discusses the possible applications of Data Science and explain how it can be used to enhance a business competitiveness. The first part of the module is dedicated to Internet basic concepts and standards, focusing on the Internet Protocols (the set of rules and regulations that determine how data is transmitted in computer networking) and formats (the standards used for converting a specific type of data to displayable information). Students will analyse the protocols and formats used to access and manage information on social networks, blogs, websites and in the other most common Internet services. The second part of the module introduces the basics of Big Data and of their use in business intelligence.

Module 2 - Mathematics and network analysis: it introduces the mathematical tools and methods that are needed for the Master. Specifically, it provides:

1) the mathematical basis needed to describe and manage complex systems;
2) the tools and methodologies for problem modelling and solving - all the stages of the development of a model and of its solution will be critically analyzed;
3) the skills to represent and analyze complex systems with particular attention to networks where different decision makers and entities interact, often with divergent goals - the concepts of network and its metrics will be introduced. Problems of revenue management, multi-criteria decision making, network analysis will be considered. As case studies, this module focuses on the use of networks for modelling problems related to tourism and culture, with a specific attention to social networks. During the lab time, students will use the simulation software NetLogo to model multi-actor systems on the Internet. NetLogo allows to simulate and study the actors’ responses to the possible choices made by the different decision makers involved in the case studies.

Module 3 - Statistics and Data Analytics: it provides the essential knowledge to understand, analyse and represent large amounts of data. The first part of the modules presents the basic concepts following a classical statistical approach. It focuses on inferential statistics (point estimation, interval estimation, hypothesis testing), linear model and least squares, probability distribution (including long tails). This first part also presents the basic instruments of computational statistics (Monte Carlo and bootstrap methods, numerical optimization methods), Bayesian inference, data reduction and data visualization techniques, techniques of graphical representation of multivariate data, (based on e.g. Trellis, Displays), principal component analysis, multidimensional scaling. The second part of the module, specifically dedicated to analysis and description of Big data, addresses topics such as clustering, supervised classification, predictive models.
During the lab time, students will apply the statistic software R to some case studies. N.B. The lecturer or professor indicated as responsible of each module is in charge of planning and coordinating the modules’ lectures. Lectures will be held by different lecturers and professors, including the responsible of the module.

**TEACHING 3**

**Data Analysis and Computational Thinking**

This course includes four modules:

**Module 1 - Machine learning** - introduces the students to the power and the limits of the systems and algorithms used for the automatic representation of information. In addition, it explains how these algorithms are capable of identifying specific characteristics of the entities of interest by considering examples, data structures or sensors, Big Data. Finally, this module presents one of the most common machine learning approaches used in the practice, to eventually apply it to specific case studies and critically analyze the results.

**Module 2 - Computer science (advanced)** - introduces the programming tools that enable the development of applications for processing Big Data and for analyzing them through cloud computing. In particular, this module first addresses advanced Python programming then deals with cloud computing by implementing a (micro) Raspberry-Pi cluster and presenting the Hadoop and MapReduce frameworks.

**Module 3 - Database and business intelligence** - introduces the techniques of storage, management, and elaboration of data. The first part of this module provides database management skills. Specifically, it presents both the traditional SQL paradigm and the more recent NoSQL paradigms. During this first part of the module, the students will realise of a non-relational database using MongoDB. The second part of the module addresses data warehousing, OLAP and business intelligence and business analytics procedures with the aim of highlighting the potential, but also the limits, of the application of these procedures in supporting decision making. The students will be invited to apply business intelligence techniques to specific cases by using the software RapidMiner.

**Module 4 - Information retrieval and data mining** - introduces the topics of information retrieval and data mining. The first part of this module presents the procedures used to manage representation, storage, organization and access to the information-rich objects that are available online. Specifically, the most commonly used procedures, their performance metrics, and application limits will be discussed and students will be invited to apply these procedures to study cases. The second part of this module focuses on the methodologies and techniques used to retrieve knowledge from large amounts of data. Specifically, techniques of web mining, social media mining, text mining and analysis mining will be discussed to highlight their potentials and limits, be invited to apply these techniques to study cases. N.B. The lecturer or professor indicated as responsible of each module is in charge of planning and coordinating the modules’ lectures. Lectures will be held by different lecturers and professors, including the responsible of the module.
TEACHING 4
Project Management
This course provides the students with knowledge on the main features of a project, such as life cycle, time/resources/budget management aspects, objectives setting. It provides the students also with the skills needed to manage projects such as team working, team organization and coordination, project planning and use of support tools (e.g., Work Breakdown Structure, GANTT charts, network diagrams, responsibility matrix), managing (e.g. roles, risk assessment, negotiation, technologies). In this course, the main tools and KPIs for the project monitoring are also presented. Within this course, the students will be required to develop and manage their own data science project using the data provided by the business partners of this Master's program. Students will work in teams and will be asked to engineer and analyze the data using the methods and tools provided in the other courses, they will be also asked to design the business case and to carry on a cost/benefit analysis. The students will then present their project, discussing their hypothesis, motivations, choices, the results they obtain and their application. The students will be finally invited to critically analyze and discuss the projects developed by their fellow students and to propose improvements.

Duration and summary of course activities and credits (crediti formativi, CFUs)
The Master's Programme lasts one year and comprises 475-hours of teaching. A 500-hour internship forms an integral part of the course and, as such, an excellent future job opportunity. However, internships for students who are already gainfully employed is facultative or can be supplanted by targeted project work. 1500-hours for a total of 60 CFUs are given over to study, including individual study and the preparation of a final thesis.

Qualification awarded
Students who have attended the course activities, completed their placement and drawn up their final dissertation will be awarded the qualification of universitary Master of first-level in Data science for travel, tourism, and culture.

Period
from February 2018 to February 2019

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Course calendar
Full time (from Monday to Friday)
* The course calendar will be finalized in detail sufficiently in advance of commencement of course activities and can be consulted on the official website of the Master.

Teaching method
Face-to-face lectures

Language
English

Attendance
Attendance is monitored through signature of the course register. Successful completion and passing of each module is conditional upon regular attendance.
Students must not in any case be absent from more than 20% of the total number of hours of lessons and have to attend to every live session.
Credits are awarded upon passing the individual modules, with the completion of placement/project work activities and passing of the final assessment.

Course venue
Villa Mocenigo / Venezia Marghera (VEGA Parco Scientifico Tecnologico di Venezia - Edificio Porta dell’Innovazione)

Admission requirements
FIRST LEVEL
/ Pre-reform university degree / diploma and three-year degree in mathematics, physics, statistics, computer or management engineering, information sciences.
The course is open to business graduates majoring in computer and computational sciences (or at least with a solid quantitative orientation) or other graduates with proven work experience in the above fields. In these cases, the specific skills will be assessed by CV and interview.
/ Equivalent foreign university qualification in an appropriate subject, subject to approval by the teaching staff
/ English level: fluent

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Admission applications
Applications must be submitted by filling in the online admission application, details of which are outlined in the article 3 of the Announcement of selection. Only applications accompanied by all required documentation will be considered. The call for applications and related documentation can be found and downloaded on the information webpage about the Master.

Selection procedure
Candidates’ applications will be assessed on the basis of qualifications held. Candidates will be notified directly of any admission tests set by the course teaching staff.

Admissibility of undergraduates
Undergraduates may be admitted to the course on condition that they obtain their degree necessarily within one month of the commencement of course activities. In such a case enrolment on the Master course may be completed only after the qualification required for admission is awarded.

Number of places available
/ The maximum number of places available is 15
/ The Master programme will be held subject to a minimum number of 20 enrolments

Fee: € 12,000
/ 1st installment December, 19th 2017: € 6,016 (including the revenue stamp of € 16)*
/ 2nd installment June, 19th 2018: € 6,000
* The cost of the stamp is not refundable

Revenue stamps
For the Italian Law is compulsory to put a revenue stamp of € 16 on every application you present to a Public Institution and on every certificate the Public Institution provides. The students are therefore requested to pay for:
1 revenue stamp on the enrollment application
1 revenue stamp on the final exam application
1 revenue stamp on every extra certificate they in case will request.
Loans and financial assistance
The information regarding eventual scholarships (if granted) wholly or partially covering the course fee is updated on the page dedicated to the Master at www.unive.it/data.

Enrolment
SUBMISSION OF ADMISSION APPLICATIONS (article 3 of the call 2017-18) within December, 6th 2017
SELECTION
December, 11th 2017
COMMUNICATION OF SELECTION RESULTS within December, 13th 2017
COMPLETION OF ENROLMENT PROCEDURE (article 6 of the call 2017-18) within December, 19th 2017

Director
Prof. Raffaele Pesenti

Website
www.unive.it/data

Information
/ For information about submission of admission applications, please contact the Coordinating Office:
Ca’ Foscari Challenge School:
tel. +39 041 234 6853 (9am - 1pm)
fax+39 041 234 6801
e-mail: master.challengeschool@unive.it
/ for information about the course contents and calendar please contact:
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