



UNIVERSIDAD
COMPLUTENSE
MADRID

ntic
master
revolucionamos la comunicación

Master's degree by the Universidad Complutense de Madrid.

Faculty of Tourism and Trade in the Universidad Complutense de Madrid.

DATA SCIENCE MASTER'S DEGREE:

Applied to trade, business and finance

**2º
EDICIÓN**

the importance of **BIG DATA**



Businesses are already adapting to the new age

Businesses and official organizations are already adapting to this new age in which mass information is processed and analyzed, data is becoming essential for business management at all decision fields. What years ago was a competitive advantage only held by a few is now becoming mandatory in order to not be left behind. Data is 21st century's gold.

»» **Macrodata**

Macrodata is a valuable tool in the creation of statistical reports, the identification of new business opportunities, prediction models about the advertising results of a future campaign or the evaluation of massive data in order to advance medical research that helps eradicate an illness.

»» **Practical applications**

Large-scale information is not an element that only affects the mathematical or statistical fields, its practical applications encompass all kinds of real-life environments. It is a fundamental value in order to face diverse situations at a business, governmental, scientific or social level.





Duration: 1 academic year.

60 ECT credits

100% Online

Why study in the UCM?

The UCM has more than 80 degrees and double degrees, more than 140 master's degrees, and also, permanent training studies. The UCM has more than 500 years of History and social recognition. The UCM is the preferred Spanish university through 5 continents. The university's prestige is endorsed by 7 Nobel Prize winners, 20 Principes de Asturias, 7 Cervantes Price winners and National Prize winners in research and excellence. The UCM has students from more than 90 different countries and is part of agreements with universities all around the globe.



Why study a UCM's master's degree?

There is no better way to learn than doing. Our training modules combine a theory base together with practical exercises based on real-life business situations. The preparation of the TFM (end-of-degree thesis) guarantees the implementation of all the knowledge acquired during the year, making sure the student is ready to assume responsibilities in a real-life working environment.



Internship agreements

The UCM and the master's degree in Big Data & Data Science has agreements set with some of the most prestigious companies in the industry, this allows the students to access internships in which they will be able to put into practice all they learned during the master's degree.

The teaching board of this master's degree has the great advantage of combining prestigious university professors with top of the industry active professionals.

The background image shows a close-up of a hand typing on a laptop keyboard. Overlaid on this is a network diagram with several white human icons connected by lines, set against a faint world map. A large red diagonal banner is in the top left corner.

Program **Big Data y Data Science**

Module I: Relational databases

The database, what is it and how do you manage one? A introduction to this basic tool in Big Data from design to its modeling and architecture. Learning of the Structured Query Language (SQL) and the tools such as Server Management Studio.

Module II: Programming languages

The student advances in the subject of statistical and predictive analysis of the Big Data expert. This module proposes a full immersion to the foundations of programming, without a need for previous knowledge.

Module III: NoSQL databases

How to use and model the NoSQL databases of structured storage. Different models NoSQL, what are they used for and when to do so, operative installation of MongoDB models; Find and its functions; projection of fields in results and CRUD operations.

Module IV: Business Intelligence

Preparation of the analytic skills of the student and his capability to handle himself in a business environment. Advance analytic and visualization of data are the main focus of this module.

Module V: Foundation in statistics

Statistics provide conclusions from the extracted data. An introduction to this great tool that the Big Data expert will have to learn, putting special attention to descriptive statistics and inferences, which allows the student to identify properties from the whole from a small sample.

Module VI: Big Data Technologies

Big Data takes a huge step with a full integration of the Internet of Things (IoT). Models of connectivity with other sources of data through message brokers and hubs: Introduction to the Spark system to express computing patterns and to Hadoop, which manages big volumes of data. Introduction to Data Visualization.

Módulo VII: Hadoop / Spark

The student will acquire a panoramic vision of HDFS, its architecture and its use through a command line. This is the fundamental storing system in the world of Big Data today, for this reason it is essential for the student to understand it and experiment.



Module VIII: Data Mining and Predictive Modeling

The value of Big Data within the business would not be understood without its predictive models. But it is essential to clean the macrodata from any bias. The student advances in the knowledge and practice of the data mining tools, linear regression algorithms and logistics, unsupervised classification, cluster analysis, scorecard...

Module IX: Machine Learning

Introduction to automatic learning techniques, an area which represents a big opportunity to manage, automatize and enrich data intelligence. Learning about decision trees, random forests, KNN algorithm, neuronal networks and deep learning.

Módulo X: Deep Learning

A Machine Learning process happens using an artificial neural network that is composed of a number of hierarchy levels. This module is separated into 4 chapters: Neural Networks, Convolutional Networks, Recurrent Networks y Autoencoders. A deeper dive into the subject is encouraged.

Módulo XI: Text Mining

Processing texts as analysis of unstructured or semi structured information. The data extraction from written sources is one of the fastest evolving fields thanks to tools such as R language. Practice in techniques of mood analysis, thematic models or opinion mining.

Module XII: Social Media and Big Data

The opinions found in social media offer a valuable information for businesses. Free software such as Paiek makes it easy to mine the data in social media, allowing for a classification a measurement of the agents in each platform.

Module XIII: Scala

Scala is the programming language focused to objects, similar to Java, with characteristics of a functional language. Spark, one of the platforms which are used for data processing in Big Data is made with Scala.

Module XIV: Advance visualization and visualization tools

The Big Data expert will only be able to make the best out of his work if he learns how to communicate it. This module is dedicated to visualization tools: map design with R, interactive representation with Shiny, graph grammar with Ggplot2, introduction to D3 and Tableau.



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Module XV: Data Science applied to business and entrepreneurship in Big Data businesses

The students will be trained in real life business situations: creation of scientific teams and organization of the data intelligence project. Finally, they will develop a startup that uses Big Data as their value proposition.

Module XVI: End of master's degree final project

To take in all the acquired knowledge, the student will design an integral strategy of data intelligence for an organization, using as many of the tools and processes in which the he was trained.

Direction team

Master's degree in Big Data and Data Science



María Concepción García Gómez

Vice-Rector for Employability and Entrepreneurship UCM.
Department of Business Organization and Marketing UCM
UCM Marketing and Business Organization Seminar



José Carlos Soto Gómez

Co-executive Director. Associate professor UCM
Funding member of the NTIC Master and Aplimovil. He expands his experience in both national and international IT projects and business analytics such as Banco de España, NEC, Telefónica, Vodafone, Orange, communication media...



Faculty members of the master's degree in Big Data & Data Science

Here at the UCM we have consummated industry professionals of high rank as professors. They teach our students the most up to date, quality content that modern institutions demand.

“Learn with the best Big Data & Data Science professionals”

FACULTY MEMBERS PROFESSORS



**María Isabel
Riomoros Callejo**

Professor UCM

Coordinator of the Virtual Campus (Facultad de Estudios Estadísticos). She is the dean's delegate for tasks regarding counseling functions in computer science and new technologies matters.



**Carlos
Ortega Fernández**

Senior Data Scientist at Teradata

Javier has experience beyond teaching as a member of research groups. In the master's degree in Big Data and Business Analytics UCM, he is one of the professors in the module "Text Mining and Social Media"



**Ismael
Yuste**

Strategic Cloud Engineer at Google

Working with Strategic customer in EMEA. Expertise on Big Data and GSuite. Bigquery, Dataproc, Dataflow, DataStudio, Pub/Sub, Datalab, DataPrep. Customer Success Engineer, at Google Apps & Cloud (an Alphabet company).



**Javier
Castro Cantalejo**

Professor in the UCM

Javier has experience beyond teaching as a member of research groups. In the master's degree in Big Data and Business Analytics UCM, he is one of the professors in the module "Text Mining and Social Media"



**Pedro Concejero
Cerezo**

***Data Scientist specialized in
conduct research in Telefónica***

Pedro is focused in the application to solving business problems of technologies such as Big Data, Machine Learning and Deep Learning.



**José Ángel
Carballo Sánchez**

NPL and ML Engineer in Telefónica

After working as a consultant in a number of different Data Science in Bankia, Vodafone..., he develops AI capabilities and NLP in Telefónica, making use of algorithms and Machine Learning

EQUIPO DOCENTE PROFESORES



**Lorenzo
Escot Mangas**

Associate Professor UCM

On top of his experience teaching in the UCM for the last 20 years, Lores is Co Executive Director of the research group “Análisis Económico de la Diversidad y Políticas de Igualdad en la UCM”.



**Manuel
Álvarez Sáez**

technology consultant

Professional with more than 30 years of experience working in business areas such as applications in tech businesses, Commercial-Management-ERP-CRM, Social Media and e-Commerce in software developer businesses like Oracle, Meta4, Sage, etc.



**Guillermo
Villarino Martínez**

***Doctor in Data Science
UCM***

His main research lines are focused in Machine Learning models and the handling of the information in order to take decisions in the field of supervised classification.



**Santiago
Mota Herce**

Corporate Advisor

Santiago is a freelance consultant in Business Intelligence, Machine Learning and strategy. He has clients to his name in the magnitude of Bankia, Vodafone, Terradato or the Boston Consulting Group



**Javier Domínguez
Gómez**

Cryptographer & Software Engineer

Executive Tech Director in Globatalent, an international ICO project which makes use of Blockchain technology to decentralize the sports world. Software engineer.



**Álvaro Bravo
Acosta**

***Technical engineer in
informatic systems***

Expert in Big Data technologies, BI and Analytics. He has worked in different consultancies (Minsait, Sopra Steria, Everis) from October 2008, working with external clients such as ISBAN and BBVA.



Adolfo Hernández Estrada

Associate professor in Statistics and Operative Research UCM

Doctor in mathematical science by the Universidad Carlos III in Madrid.

Executive Director of the UCM group “Metodos Estadísticos y Big Data aplicados a la Economía, el Turismo y otras Ciencias Sociales”.



Pablo J. Villacorta

Data Scientist in Stratio data

Doctor in Computing Science and AI, informatic engineer and licensed in statistics by the Universidad de Granada. Accredited developer in Spark x2 by Databricks and author of various R packages published in CRAN.



Charles Flores Espinoza

Big Data Engineer in Stratio Big Data

With experience in Spark, Scala, Python. Charles experience precedes him with more than 10 years of experience in the industry. He also enjoys being a Data Scientist from time to time.



Pedro Pablo Malagón Amor

Sales Engineer Google Cloud

After 17 years working for Microsoft as Project Manager, engineer or Cloud Data Architect, our professor of Big Data Technologies works in Google with subjects in the field of massive data and its business uses.



Fernando Velasco

Researcher in AI techniques and algorithms.

Fernando has a master's degree in advanced mathematical methods applied to physics, he also studies human interactions through Deep Learning.

Información **GENERAL**



Straight to business

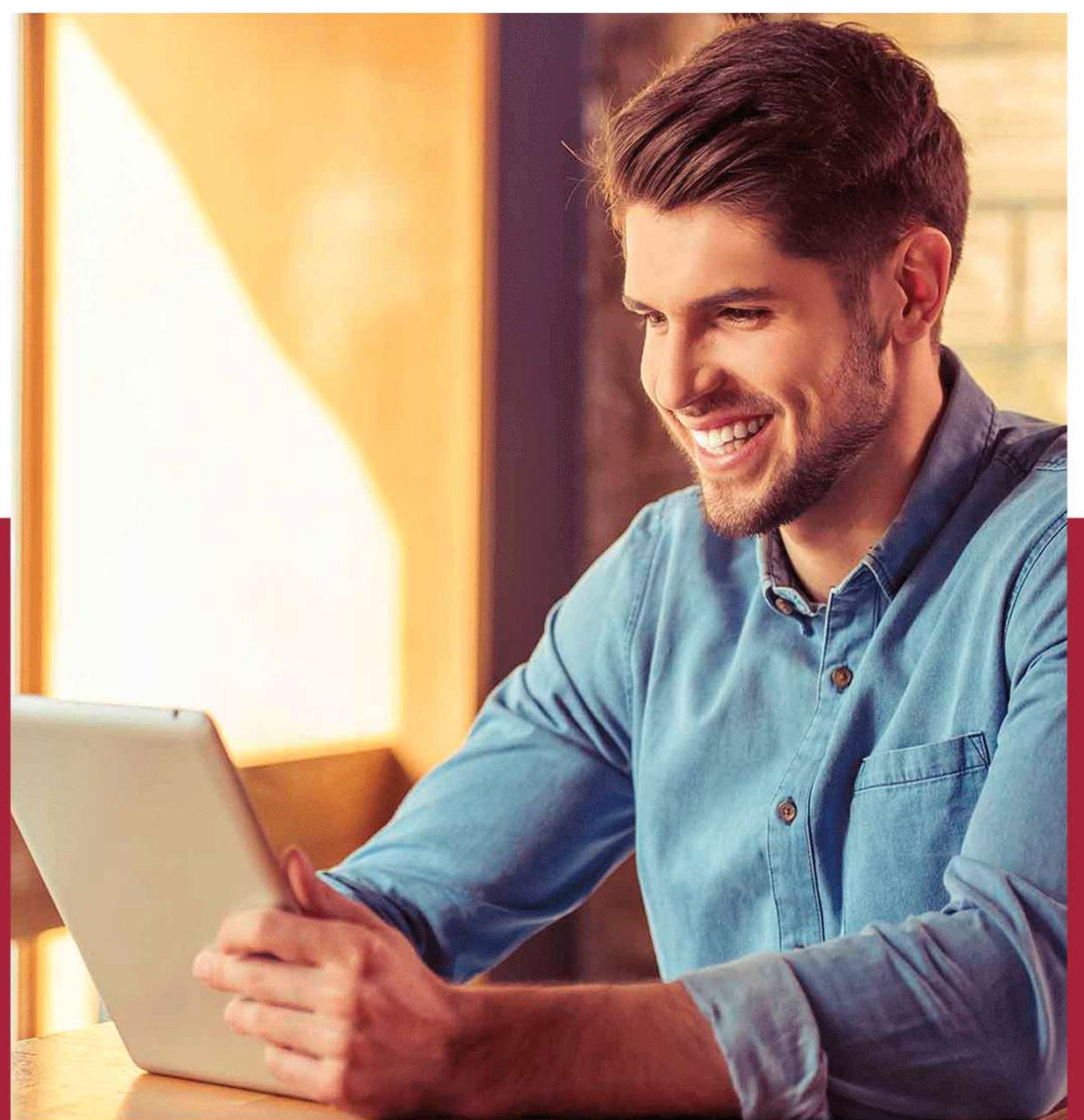
At the end of the degree, the student will be ready to face any situation in a data intelligence business, resulting in a highly employable professional. The Big Data professionals are often included in each edition of Spring Data's annual report "The most searched by the human resources consultancy Adecco" which identifies the most demanded and better paid, highly educated professionals.

»» **Career opportunities**

- Data Analyst
- Massive data system auditor
- AI Architecture
- Developer of data at large scale

»» **Career opportunities**

- eCommerce Data Analyst
- Digital Transformation for Companies
- Data Steward
- Data Artist
- Chief Data Officer (CDO)





- 1. Pre-inscription:** Sending the documents and evaluating the candidates
- 2. Interview:** Personal evaluation of the candidate
- 3. Admission:** Confirming the suitability of the candidate
- 4. Reservation:** Welcome, formalize the reservation of your place

Information on **Appliances**

Those interested in taking part in this master's degree must fill an online survey from the appliance tab, do not forget to attach the required documentation. The candidates who fulfill the obligatory requisites will be called for a personal interview. Once you have the confirmation for your placement, you must formalize a reservation. The admission window is prolonged until all places are full, or if it were to happen, at the beginning of the academic course. Admitted students must make a payment of 500€ for the in-class degree and 350€ for the online edition. These quantities will be fully discounted from the full price of the tuition. Once the payment is made there is no right to a refund unless the degree was to not take place.



Required Documents

Photocopy of ID / passport.
Official grade certificate.
University degree or title application receipt.
Curriculum vitae.



Students with degrees from the European Union

European Union:

Both the university degree and the official grades certificate must come with a sworn translation.

Students from outside the European Union:

Both the university degree and the official grades certificate must be legalized by the Hague Apostille. If the degree or the certificate are in a different language than Spanish it must come with a sworn translation.



After completing the master's degree, the UCM will hand the student a certificate of postgraduate in their own right, always under the rules of admission and appliance of the UCM.



General Information **ONLINE**



Dates

Start: 19th October 2020
End: September 2021



Credits

Credits: 60 ECTS



Price

Price: 4.350€ + 40€
department expenses

»» **100% Online Methodology**

The training will be supervised by the professors. This online platform will be used to communicate between students and professors, creating a virtual working environment.

The different professors from each module will guide the students by proposing additional activities according to the syllabus being taught at that moment.

»» **Online program characteristics**

- Individualized messaging for each student integrated in the platform
- Videos
- Video tutorials
- Documents
- Communication with the professors, via messages, forum and chat.

The platform will act as a communication channel between the student and the global training environment. The student will have access to updated information about the syllabus being taught at each moment, such as links to additional content including news, articles, etc. Students will have to complete and pass every project from the different modules, as well as completing the end of degree thesis in order to pass this master's degree.



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After completing the master's degree, the UCM will hand the student a certificate of postgraduate in their own right, always under the rules of admission and appliance of this University.

Appliances open / **limited places**

Start of the Master's degree: September 2020

CONTACT



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