UNIVERSIDAD
COMPLUTENSE
MADRID

Master's Degree
Faculty of Geography and History

SMART AND SUSTAINABLE CITIES (SMART CITIES)

MASTER'S DEGREE
SMART AND SUSTAINABLE CITIES (SMART CITIES)

Field of Knowledge: **History, Archaeology, Geography, Philosophy and Humanities**
Responsible center: **Faculty of Geography and History. Universidad Complutense de Madrid (UCM)**

www.ucm.es/masterciudadesinteligentesysostenibles

Orientation: **professional**
Credits: **60 ECTS**
Duration: **1 year 2 (semesters)**
Modality: **face-to-face**

OBJETIVES

The Master's Degree in Smart Cities addresses an emerging issue in the field of urban studies that is generating a growing demand for training from urban managers, planners and other professionals of all kinds.

The Master's Degree has a clear professional interest and is designed to meet the training needs of students who want to enter an expanding labour market due to the growing social demand for professionals capable of analysing and interpreting the reality of cities, and of designing urban projects and programmes to improve the well-being of citizens based on the implementation of new information technologies: advanced city analysis techniques based on new data sources (including big data), the use of geographic information systems, artificial intelligence or remote sensing and photo-interpretation tools, the development of maps and online applications or the use of drones for data capture and analysis of the territory.

As the syllabus shows, the fields of application of all these techniques are various, covering the social, environmental, and economic spheres.

PROSPECTIVE STUDENTS

The recommended academic profile is that of graduates in disciplines related to the city, technology or sustainability, from both social sciences (geographers, economists, sociologists, environmentalists, business administration, etc.) and technical degrees in the field of architecture, urban planning, computer science or engineering.

The selection of students in the admission process will be made taking into account the suitability of the student's academic profile to the contents of the Master's Degree, the academic record in the entrance qualification and the curriculum vitae of the applicant. Most of the lectures are given in Spanish.

WHY STUDY THIS MASTER'S DEGREE?

Cities, and the way we live in them, are undergoing a radical transformation. The Master's Degree in Smart Cities, in addition to its higher education nature, trains students in the theoretical knowledge and use of the technological tools necessary to respond to the challenge of analysing and planning the cities of the future. The Master prepares for professional work in institutions and public or private companies, offering internships with leading entities in the field of Smart Cities.

STRUCTURE

This Master's Degree is organised into four modules, with a total course load of 60 ECTS:

- Module 1. Concepts and Technologies for Smart and Sustainable Cities (Smart Cities): 18 compulsory ECTS. It consists of one subject with five subjects to be taught during the first semester
- Module 2. Smart and Sustainable Cities: Dimensions, Instruments and Techniques: 24 optional ECTS. It is divided into three subjects. Students must take 8 subjects of 3 credits, to choose from a total of 36 credits. The subjects are spread over the two semesters
- Module 3. External Work Placement: 12 compulsory ECTS to be carried out in companies and public administration bodies
- Module 4. Master's Final Project: 6 compulsory ECTS

There are no itineraries, so the optional credits to be taken can be chosen from all the optional subjects offered in the three subjects that make up Module II.

Those students who lack the necessary knowledge of Geographic Information Systems, Remote Sensing and Photointerpretation must take a compulsory subject Introduction to Geographic Information Technologies of 4 credits within the framework of the Master's training complements, which will be offered in the first semester.

SYLLABUS

SUBJECT TYPE	ECTS
Compulsory	18
Electives	24
External Internships	12
Master's Thesis	6
Total	60

COMPULSORY SUBJECTS	ECTS	SEMESTER
Module 1. Concepts and Technologies for Smart and Sustainable Cities		
Subject 1.1 Smart Cities: Concepts and Technologies		
Computer Programming Applied to Smart Cities	6	1st
Fundamentals and Applications of Sensors in Smart Cities	3	1st
Geographical Information Systems Applied to Smart and Sustainable Cities	6	1st
Remote Sensing and Airborne Data Capture, Visualisation and Analysis in Smart Cities	3	1st
Smart Cities and Sustainable Cities (Smart Cities)	3	1st

ELECTIVE SUBJECTS	ECTS	SEMESTER
Module 2. Smart and Sustainable Cities: Dimensions, Instruments and Techniques		
Subject 2.1 Instruments for Environmental Sustainability		
Ecological Footprint in Smart Cities	3	1st - 2nd
Ecosystem Services and the Protection of Natural Heritage	3	1st - 2nd
Pollution, Urban Climate and Climate Comfort	3	1st - 2nd
Resilience Strategies in Smart Cities in the face of Natural Hazards and Climate Change	3	1st - 2nd
Subject 2.2 Instruments for the Economic Sustainability		
Development Strategies and Competitiveness in Smart Cities	3	1st - 2nd
New Urban Economies, Innovation and Knowledge	3	1st - 2nd
Smart Tourism Destinations	3	1st - 2nd
Urban Mobility and Smart Transport	3	1st - 2nd
Subject 2.3 Instruments for Social Sustainability in Smart Cities		
Governance, Social Participation and Citizen Security in Smart Cities	3	1st - 2nd
Indicators and Tools for Social Equity in Smart Cities	3	1st - 2nd
Instruments for the Optimisation of Services to the Population in Smart Cities	3	1st - 2nd
Social Exclusion and Citizen Security in Smart Cities	3	1st - 2nd

EXTERNAL INTERNSHIPS	ECTS	SEMESTER
External Internships	12	2nd

MASTER'S FINAL PROYECT	ECTS	SEMESTER
Master's Thesis	6	2nd

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For more information: www.ucm.es/masterciudadesinteligentesysostenibles

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