

MCS

Master in City Sciences

**2015/2016
Application Period
Now Open**

The **Master in City Sciences** is an advanced cross-cutting postgraduate program between the schools of engineering and architecture that provides a holistic approach to the development of the city. The **MCS** responds to the demand of professionals with a technical and comprehensive vision of the urban phenomenon beyond the concept of Smart Cities.

**Transport &
Mobility**

**Information &
Communication
Technologies**

**Urban &
Landscape
Design**

Energy

**Society &
Governance**

**Urban
Planning**

**Environment &
Sustainability**

**Economy &
Business**

**Ecological
Urbanism**

VentureLab

Last Edition Guest Lecturers:
Michael Batty, Andy Hudson-Smith_UCL+CASA / Iñaki Ábalos, Richard TT Forman, Pierre Belanger_Harvard University / Patrick le Galès_Sciences Po / Caroline Howe_MIT / Ajit Jaokar_Oxford University / Phil Krein_IIT / Alday&Jover_University of Virginia / Maria Arquero_University of Michigan / Luca Benini_ETH / David Wilson_Imperial College London / Joan Subirats_Universitat Autònoma de Barcelona / Juan de Dios Ortúzar_Universidad Católica de Chile / José Holguin_Rensselaer Polytechnic Institute

The **Master in City Sciences** network includes collaborators and lecturers from the most distinguished universities worldwide, as Harvard University, University College London, Massachusetts Institute of Technology, Illinois Institute of Technology and ETH.

The **MCS** is a unique 60 ECTS program that integrates all the core disciplines regarding the city.

**Universidad Politécnica de Madrid
Master of Advanced Studies in
City Sciences**

**2nd Edition
October 2015 - September 2016
Madrid, Spain**

citysciences.com



MCS

Master in City Sciences

Universidad Politécnica de Madrid
Master of Advanced Studies in City Sciences

2nd Edition
October 2015 - September 2016
Madrid, Spain

citysciences.com

MCS AREAS

CITY SCIENCES BASICS

Directed by José Manuel Páez
The aim of this area is to give a general overview of what does City Sciences mean. It will introduce the importance of the holistic vision of the problems related with cities. There is an actual need for professionals that can have an interdisciplinary approach to the urban fact in order to give response and offer better solutions for the future challenges that cities will face. In this area students will be taught how the disciplines can work together and how all the areas from the master interact with each other.

TRANSPORT & MOBILITY

Directed by Andrés Monzón
We need sustainable strategies to change our life styles to be less dependent of pollutant vehicles and to reduce the need of travel. Smart cities could provide the technological base to deploy less car dependent mobility patterns. Information and communications systems will help to develop working, shopping, social trips in a more sustainable way. The three pillars to built the sustainable city of the future are: planning urban space and to control urban sprawl (expansion of cities), to restrict the use of car in urban areas and to develop intelligent public transport systems of high quality. This area will teach students about the urban mobility trends and modal split; externalities and mobility management; the land use and transport interactions; soft modes like walking and cycling; the integrated mobility strategies; city logistics and sustainable urban mobility plans.

INFORMATION & COMMUNICATION TECHNOLOGIES

Directed by Claudio Feijóo
This module of the MCS gathers all the knowledge related with the present and future of next generation networks, big data, visual analytics and ICT governance. Next generation networks will support a renewed electronic communication structure where opportunities lie in the provision of ubiquitous ultra-broadband connectivity, novel applications, appealing contents and the general support to the sustainable development of all the economic sectors. NGNs appear as the key technology for the provision of smart transportation, smart grids, Internet of Things, big data, open government and all types of new services and applications. Internet of Things (IoT) will be the supporting technology for any type of smart environment. It is based on a network of sensors on physical objects equipped with Internet protocols –therefore seamlessly integrated within Internet- and able to create communications networks automatically and send / receive information without direct user intervention –machine-to-machine communications, M2M. Data acquisition, data processing, wireless transmission and routing, and data fusion and consolidation are the basic building blocks of any IoT deployment. While it is recognized that ICTs are changing city government systems, little is currently known about what this signifies, how ICT-driven changes are affecting governance processes and what are the successful technological and organizational solutions to be adopted. The ICT-governance subarea will present and discuss how current research and practice are addressing this gap and show how this change manifests itself in new governance models, public sector management practices, revised institutional processes and organizational structures.

URBAN AND LANDSCAPE DESIGN

Directed by Burgos & Garrido Arquitectos
This area integrates different fields that city design has to take into account such as Landscape Design, Urban Design and Urban regeneration. Landscape Design will explore the demand of the contemporary city of a more extensive and manifold relationship with the natural environment that gave sense to the city in its origin. In a way in which the built artifact is strongly linked with its geographical and ecological context and thus the dynamic natural processes would enrich and make more sustainable the urban fabric, overcoming the exclusionary dichotomy in which the city and the landscape were realities located in antagonistic geographies. Finding an agreement between nature and artifice is a critical element of the XXI century city. Likewise, in the Urban Design and Urban regeneration specialty, this area aims to provide an operational framework on the main challenges that the European city is facing nowadays: increasing the capacity and scale of the intervention, with an increasing number of homes and uses; the evolution of a monocentric city to a nodal city as an urban-territorial articulation; and the growing need of renovation and revitalization of large parts of the residential fabric in the consolidated city.

URBAN PLANNING

The course aims at providing a comprehensive understanding of the ways in which cities and city form/s get put together and of the kind of distinct design, project and planning problems arising from its fragmented and to a large extent hazardous and somewhat unpredictable character.

SOCIETY & GOVERNANCE

Directed by Jesús Leal
The sociology specialty aims to bring students to an understanding of the requirements that may have the city of the future. Cities that can meet the challenges of a cohesive and supportive society, with a clear identity, adapted to technological innovations, sustainable, well governed (with efficiency and justice), and based on a participatory democracy. These are values that are permanent and can be considered a high priority. Based on these requirements the specialty is divided into seven subtopics that would be developed from the analysis of specific cases.

ECONOMY AND BUSINESS

Directed by Álvaro Martín & José A-Herce
Cities perform major economic functions as they organize the life of their citizens and facilitate their own economic performance. By concentrating on some of these economic functions and their territorial, policy, budgetary, entrepreneurial and business development implications this area tries to complement the more dominant urban and planning dimensions.

ECOLOGICAL URBANISM

Directed by Javier García-Germán
This module considers the discussion on ecology and energy as an opportunity to reconsider the way cities are conceptualized. Existing perspectives which give priority either to its spatial structure or to the way cities function is being superseded by a more consistent and holistic view which overlays its structure (spatial structure and built systems), performance (climate and use through time) and its connections and exchanges with the environment. The aim of the course is delineate this new conceptualization of the city. To achieve this end, scientific and technical knowledge will be merged with its cultural contextualization; these two tracks, the technological and the theoretical, will crisscross throughout the course to transmit a critical perspective on energy and sustainability that can propel effective applications on design.

ENVIRONMENT & SUSTAINABILITY

Directed by Julio Lumbereras
This area deals with the main environmental issues at urban scale serving as a starting point for discussion of strategic approaches to solve them. The main problems are those threats to present or future human well-being, resulting from human-induced damage to the physical environment, originating in urban areas. The specialty is divided in five main topics: air quality management as an important issue with direct implications on urban planning, mobility and public management in general; air quality modeling as one of the main tools for the development of an urban air quality plan; public health as the ultimate target of urban air quality plans; materials cycle in the city and municipal solid waste management.

ENERGY

Directed by Óscar García
Energy is crucial for our lives. The modern society and our quality of life are based on the extensive use of energy. Today, there is a continuous objective of reducing the power consumption without losing quality of life. At the same time, the presence of clean energy resources is becoming more necessary every day. A mix of conventional electrical generators together with a very spread generation based on wind, solar, bio-mass and others will provide our future energy. Since the amount of energy will be higher to power new loads such as electrical cars, it is crucial to improve the efficiency of all the equipment. Moreover, the presence of millions of sensors and detectors that will monitor and control our environment will force to use new forms of supplying energy.

VENTURE LAB

Directed by Sergio Ramos
Cities face increasing challenges when it comes to providing advanced digital services, or becoming the playing field for third party developers of services and applications. The concept has to evolve in order to match with the existing reality, in which information availability and capacity of interaction with the Administration at any time is an increasing demand. Likewise, there is a wide range of business opportunities to provide new ways of interaction with the city and its elements. The challenge lies in developing platforms that gather innovation openly from stakeholders and allow the rapid provision of applications following the paradigm of mobile communications.

ABOUT MCS

The Technical University of Madrid (UPM) is promoting a unique and cross-cutting postgraduate program between the schools of engineering and architecture that has already become an international benchmark. The Master in City Sciences is an advanced program that provides a holistic view on the development of the city.

Nowadays, the city is the first economic and social engine worldwide. It is the object of interest of the most important companies. Traditional university courses have failed to respond to the urgent demand of professionals with a technical and comprehensive vision of the urban phenomenon. Answering this demand, the MCS program integrates disciplines related with planning, energy, sociology, economics and all the new technologies and infrastructures that are the core of the functioning of the city.

Right from the start, students from all nations will be trained in city-related areas both in a theoretical and practical way, in order to achieve a high professional level. MCS is based on real projects that will be approached as case studies.

This transdisciplinary approach has made that important international companies are involved in the MCS faculty, in the preparation of the final master thesis and in the possible subsequent employment.

The international character and the pursuit of excellence are reflected in the workshops together with other international universities and in the quality of the faculty staff, which aims to have the best international figure of each field.

MCS is committed to the highest level of education combining professors of international prestige and a thorough participant selection process in order to make the best out of this course. The UPM will establish an admission process among all those engineers, architects, economists and graduates interested in becoming highly qualified professionals, able to understand and manage the multidimensional nature of the city.

José María de Lapuerta
MCS Director

FACULTY & STAFF

DIRECTOR

José María de Lapuerta

ACADEMIC COMMITTEE

José María de Lapuerta, Javier Uceda, José Manuel Páez, Claudio Feijóo

SPECIALTY AREA DIRECTORS

José Manuel Páez, Claudio Feijóo, Andrés Monzón, Jesús Leal, Javier García-Germán, Ginés Garrido, Francisco Burgos, Julio Lumbereras, Óscar García, Sergio Ramos, Bernardo Ynzenga.

PROFESSORS

Ajit Jaokar, Esther Higuera, José Antonio Herce, Sotiris Vardoulakis, María E. López Lambas, Carlos G^o Suárez, José M^a López, Jorge Rodríguez, José María Ezquiaga, Rocio Cascajo, Gianluca Misuraca, Natalia Sobrino, Cristina Valdes, Juan Miguel Hernández de León, Asunción Santamaría, José Ramón Casar, Ana Bernardos, Iris Galloso, José Miguel Fernández Güell, Pierre Rossel, Mila Gasco, Luca Piovano, Antonio Saravia, Isidro Laso, Ángel Aparicio, Oscar Martínez.

RENOUNED INTERNATIONAL GUEST LECTURERS

With international renowned faculty in their respective fields, students are exposed to a unique experience. Among the many guest lecturers, the MCS counts with:

Michael Batty, Iñaki Ábalos, Belinda Tato, Patrick le Galès, Richard TT Forman, José Holguin, Juan de Dios Ortuzar, Andy Hudson-Smith, Alday&Jover, María José Arquero, David Wilson, Caroline Howe, Joan Subirats, Sandra Marques, Yuri Grigoryan, Pierre Belanger, Luca Benini, Phil Krein, Enric Batllé, Paulina Beato, Blanca Losada, Francisco Jariego, José Carlos González, Juan Murillo, Lorenzo Madrid, Terry Lobel.

INTERNATIONAL CONFERENCE ON CITY SCIENCES

SHANGHAI INTERNATIONAL CONFERENCE ON CITY SCIENCES

Complementing the holistic knowledge provided in the program, MCS includes an international stay in a renowned Chinese university, the Tongji University in Shanghai. In this university, MCS will develop an International Conference on City Sciences in collaboration with the Tongji University faculty.

Shanghai ranks as one of the top-5 world megacities and is currently known as the New Silicon Valley for Architecture. Furthermore, Tongji University is recognized as one of the two best Chinese universities for Architecture and Civil Engineering.

MCS, with the support of the Sino-Spanish Campus@Tongji will develop a one-week International Conference on City Sciences on the real case of the City of Shanghai with the help of local and international academics and professionals.

COMPANY INVOLVEMENT

Major international companies and the top ones from the IBEX 35 have shown interest in this new professional profile, proving its importance.

MCS is an exclusive degree, not offered in traditional careers, that has an increasing and current demand. Students will become professionals with an absolutely distinguishing profile in the job market.

Encouraging the relation university-industry, the final thesis will be focused on relevant issues in the professional world, where the companies themselves may be interested. This will allow students to specialize in their field of interest at the same time than they have the opportunity to develop their thesis relating it with the work that some of this international companies are carrying on.

LIFE AFTER MCS

The aim of MCS is to train engineers and architects to take part in complex decision-making processes dealing with the future of our cities in international companies.

JOB COUNSELING

MCS's main goal is the job placement of specialized professionals who can address global problems and take important roles in companies or make contributions in fields such as environmental science, urban ecology or smart city policies.

PROFESSIONAL PAID INTERNSHIPS

The Master's final thesis project will be the prelude or the starting point of the relationship with the company that will later choose the best ranked student for paid internships.

In addition, there are planned trips in Madrid, where buildings, neighbourhoods and different infrastructures, subject of study, will be visited accompanied by their respective experts. All domestic visits and field trips are included in the MCS fee.

MADRID VISITS

All domestic visits and field trips are included in the MCS fee.

PROGRAM INFO

SPECIALTY AREAS

The aim of the different areas is to cover a wide range of important city issues. To that sense, participants will have to combine theoretical subjects with practical work, projects deadlines and diverse teaching methods.

INFORMATION AND DATA

Additional supporting documents will be provided to all students periodically. Some teachers may not hand over written information about their conference.

ATTENDANCE

There will be a daily control of attendance.

* MCS will follow a strict policy regarding attendance, course withdrawal and incorrect behaviour.
**MCS keeps its right to make changes in the program.

REGISTRATION PERIOD

Until 31.07.2015 or until vacancies are filled.

TUITION FEE

17.900€
This fee includes Shanghai International Conference on City Sciences travel, accommodation and fee, as well as Madrid field trips.

PARTICIPANTS

Engineers, architects, economists and professionals profiles that demonstrate a relation with the city development. The MCS is open to students from all nations interested in becoming highly qualified professionals, able to understand and manage the multidimensional nature of the city.

REQUIREMENTS

The course is intended for qualified engineers, architects and economists who have completed their bachelor degree or equal level certificate. The official language is English, therefore participants must be able to communicate in this language.

ADMISSION PROCESS

Candidates have to follow a three-step process:

1. Fill in the on-line application form.
2. Send a motivation letter, CV and two recommendation letters.
3. The student will be called for a personal interview with a member of the academic committee.

After the participant profile is evaluated by the academic committee, the candidate receives an email with the result of the deliberation. If positive, the candidate will have to make the following fee payments:

Reservation fee: 1.000€ (non refundable) within 15 days after admission.
30% of the tuition fee: 5.070€ before 31.07.2015
70% of the tuition fee: 11.830€ before the beginning of the corresponding edition.

MCS

Master in City Sciences

Universidad Politécnica de Madrid
Master of Advanced Studies in City Sciences

2nd Edition
October 2015 - September 2016
Madrid, Spain

citysciences.com

