| Teaching Guide | | | | |
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| Identifying Data | | | | 2023/24 |
| Subject (*) | Smart cities. Emerging technologies for sustainable cities | | Code | 670526014 |
| Study programme | Mestrado Universitario en Edificación Sostible (Plan 2017) | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Official Master's Degree | 2nd four-month period | First | Obligatory | 3 |
| Language | Spanish | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | Expresión Gráfica Arquitectónica | | | |
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| Web | euat.udc.es | | | |
| General description | The emerging concept of Smart City encompasses multidisciplinary solutions that seek to improve the management of urban services using information technologies to ensure social and environmental sustainability. With a transversal vision, this subject seeks to introduce the fundamental concepts of a Smart City and the different dimensions that make up the development of the model. Basic notions of the different technologies involved in the process are also introduced, such as the Internet of Things (IoT) concept, the Big Data phenomenon, Cloud Computing and the visualization, analysis and processing of information in relation to with the principles of sustainability, the new urban economy and the relationship with citizens. It is also intended to bring students closer to the field of innovation in the field of emerging and disruptive technologies that may be useful in the building sector. | | | |

| Study programme competences | |
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| Code | Study programme competences |
| A14 | CE14 Comprender e analizar os cambios producidos na sociedade do coñecemento que inflúen na organización das cidades e os procesos espaciais, económicos, culturais e sociais que se derivan deles. |
| A15 | CE15 Coñecer e comprender os cambios, retos e oportunidades que facilitan as novas solucións tecnolóxicas para unha xestión da cidade integrada e sustentable. |
| A16 | CE16 Coñecer as tecnoloxías e ferramentas básicas para a implementación e xestión dunha smart city |
| B1 | CB01 Posuír e comprender coñecementos que acheguen unha base ou oportunidade de ser orixinais no desenvolvemento e/ou aplicación de ideas, a miúdo nun contexto de investigación. |
| B2 | CB02 Saber aplicar os coñecementos adquiridos e a súa capacidade de resolución de problemas en contornas novas ou pouco coñecidos dentro de contextos máis amplos (ou multidisciplinares) relacionados coa súa área de estudo. |
| B3 | CB03 Ser capaces de integrar coñecementos e enfrontarse á complexidade de formular xuízos a partir dunha información que, sendo incompleta ou limitada, inclúa reflexións sobre as responsabilidades sociais e éticas vinculadas á aplicación dos seus coñecementos e xuízos. |
| B4 | CB04 Saber comunicar conclusións ?e os coñecementos e razóns últimas que as sustentan? a públicos especializados e non especializados dun modo claro e sen ambigüidades. |
| B5 | CB05 Posuír as habilidades de aprendizaxe que permitan continuar estudando dun modo que haberá de ser en gran medida autodirigido ou autónomo. |
| B6 | CG01 Capacidade de análise e síntese. |
| B8 | CG03 Coñecementos informáticos relativos ao ámbito do programa formativo. |
| B9 | CG04 Capacidade de xestión da información. |
| B10 | CG05 Resolución de problemas. |
| B14 | CG09 Razoamento crítico. |
| B15 | CG10 Compromiso ético. |
| B16 | CG11 Aprendizaxe autónoma. |
| B18 | CG13 Creatividade. |
| B19 | CG14 Iniciativa e espírito emprendedor. |

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| B23 | CG18 Orientación a resultados. |
| C1 | CT01 Expresarse correctamente, tanto de forma oral como escrita, nas linguas oficiais da comunidade autónoma. |
| C2 | CT03 Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida. |
| C5 | CT05 Entender a importancia da cultura emprendedora e coñecer os medios ao alcance das persoas emprendedoras. |
| C6 | CT06 Valorar críticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse. |
| C8 | CT08 Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade. |

| Learning outcomes | | | |
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| Learning outcomes | Study programme competences | | |
| Understand and analyze the changes produced in the knowledge society that influence the organization of cities and the spatial, economic, cultural and social processes that derive from them. | AC14 | BC1<br>BC2<br>BC6<br>BC9<br>BC14<br>BC15 | CC1<br>CC6<br>CC8 |
| Know and understand the changes, challenges and opportunities that facilitate new technological solutions for a smart, integrated and sustainable city management. | AC15 | BC1<br>BC3<br>BC4<br>BC5<br>BC6<br>BC9<br>BC16<br>BC19<br>BC23 | CC1<br>CC2<br>CC5<br>CC6<br>CC8 |
| Know the basic technologies and strategies for the implementation of the Smart City. | AC16 | BC1<br>BC2<br>BC6<br>BC8<br>BC9<br>BC10<br>BC14<br>BC18<br>BC23 | CC2<br>CC5 |

| Contents | |
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| Topic | Sub-topic |
| Topic 1. INTRODUCTION | Urban transformation in the information and knowledge society: the "Smart Cities" concept. Background, evolution and regulations |
| Topic 2. THE SMART CITY MODEL | Dimensions of the model. Enabling forces. Stages of development. Services. |
| Topic 3. SMART CITY TECHNOLOGIES | Introduction to the Internet of Things and interaction with information from the environment. Introduction to Big Data and the technological infrastructures for the capture, processing and analysis of information. Data visualization and information analysis. Emerging and disruptive technologies in the AEC field (Architecture, Engineering and Construction). |

| Planning |
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| Methodologies / tests | Competencies | Ordinary class hours | Student?s personal work hours | Total hours |
|---|---|---|---|---|
| Guest lecture / keynote speech | A14 A15 A16 B4 B5 B6 B14 B15 B16 C1 C5 C6 | 15 | 12 | 27 |
| ICT practicals | A16 B1 B2 B4 B6 B8 B9 B10 B15 B16 B18 B19 B23 C2 C5 C6 | 6 | 6 | 12 |
| Supervised projects | A14 A15 A16 B1 B2 B3 B4 B6 B9 B14 B16 B18 B19 C1 C6 C8 | 0 | 35 | 35 |
| Personalized attention | | 1 | 0 | 1 |
| (*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students. | | | | |

| Methodologies | |
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| Methodologies | Description |
| Guest lecture / keynote speech | The master class is also known as "lecture", "exposition method" or "master lesson". This last modality is usually reserved for a special type of lesson taught by a teacher on special occasions, with content that involves an original elaboration and based on the almost exclusive use of the word as a means of transmitting information to the audience. |
| ICT practicals | Methodology that allows students to learn effectively, through practical activities (demonstrations, simulations, etc.) the theory of a field of knowledge, through the use of information and communication technologies. ICTs are an excellent support and channel for the treatment of information and practical application of knowledge, facilitating learning and the development of skills by students. |
| Supervised projects | Methodology designed to promote the autonomous learning of students, under the tutelage of the teacher and in varied settings (academic and professional). It refers primarily to learning "how to do things." It is an option based on the assumption by students of responsibility for their own learning.<br>This teaching system is based on two basic elements: the independent learning of the students and the monitoring of this learning by the teacher-tutor. |

| Personalized attention | |
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| Methodologies | Description |
| ICT practicals<br>Supervised projects<br>Guest lecture / keynote speech | The personalized tutorial attention on informative or punctual questions will preferably be carried out through the UDC institutional email, although the available institutional telematic tools for teamwork, such as Microsoft Teams, may also be used. |

| Assessment | | | |
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| Methodologies | Competencies | Description | Qualification |
| ICT practicals | A16 B1 B2 B4 B6 B8 B9 B10 B15 B16 B18 B19 B23 C2 C5 C6 | The active participation and use of the students in the practices that are carried out on the contents of the subject through ICT tools will be valued. | 20 |
| Supervised projects | A14 A15 A16 B1 B2 B3 B4 B6 B9 B14 B16 B18 B19 C1 C6 C8 | The suitability of the work carried out by the student to the criteria and guidelines set by the teacher will be assessed. | 80 |

| Assessment comments |
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| In order to obtain a positive evaluation in the subject the student must attend at least 80% of the classes (lectures, workshops, seminars, ...).In order to be qualified, the delivery in time and form of all the proposed works will be mandatory.Students who do not turn in the final work of the subject on the date indicated will be classified as NOT PRESENTED in the final evaluation of the First Chance. In no case will term extensions be established. In order to be evaluated, it is mandatory to have delivered the previous work proposal in due time and form, and it must have been accepted by the professor of the subject.The delivery of the work for the final evaluation in the Second Chance will be carried out in the Moodle application of the subject with the same conditions set for the delivery of the First Chance (digital copy of the final work in doc / odt and pdf formats). The date of this delivery will be communicated in advance through the Moodle platform and this last term will be non-extendable.In these deliveries, the corresponding indications of the teaching staff responsible for the subject must be followed.In addition to the assistance, participation and performance of supervised works, the tests considered necessary may be carried out in order to properly assess the degree of assimilation of the conceptual and procedural contents of the subject.Implications of academic fraud: The fraudulent performance of the tests or evaluation activities, once verified, will directly imply the failing grade "0" in the subject in the corresponding call, thus invalidating any grade obtained in all the evaluation activities for the extraordinary call. |

| Sources of information | |
|---|---|
| **Basic** | - BATTY, Michael (2013). The New Science of Cities. MIT Press<br>- DEL RIVERO, Marieta (2017). Smart Cities. Una visión para el ciudadano. LID<br>- FERNÁNDEZ, Manu (2016). Descifrar las Smart Cities. ¿Qué queremos decir cuando hablamos de Smart Cities?. Caligrama Editorial<br>- GOLDSMITH, Stephen; CRAWFORD, Susan (2014). The Responsive City: Engaging Communities Through Data-Smart Governance. San Francisco, CA: Jossey-Bass (Wiley)<br>- JACOBS, Jane (2011). Muerte y vida de las grandes ciudades. Editorial Gustavo Gili<br>- MITCHELL, William J. (2001). E-topia: Vida urbana, Jim, pero no la que nosotros conocemos. Editorial Gustavo Gili<br>- PICON, Antoine (2015). Smart Cities: A Spatialised Intelligence. Wiley<br>- SIMONE NOVECK, Beth (2015). Smart Citizens, Smarter State: The Technologies of Expertise and the Future of Governing. Harvard University Press<br>- TOWNSEND, Anthony M. (2013). Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia. New York: W. W. Norton Inc.<br>- VV.AA. (2013). SMART CITY. Hacía la gestión inteligente. Marcombo<br>- VV.AA. (2017). Smart Cities: Foundations, Principles, and Applications. Wiley<br>- de WAAL, Martijn (2014). The City as Interface: How New Media Are Changing the City. Rotterdam: NAi010 Publishers<br>- FINQUELIEVICH, Susana (2016). I-Polis. Ciudades en la era de Internet. Diseño Editorial |
| **Complementary** | |

| Recommendations |
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| **Subjects that it is recommended to have taken before** |
| Introduction to the Master thesis: methodology and research planning/670526004 |
| **Subjects that are recommended to be taken simultaneously** |
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| **Subjects that continue the syllabus** |
| Master Thesis/670526027 |
| **Other comments** |
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**(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.**