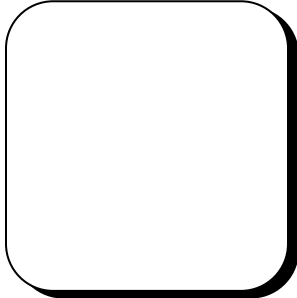




Universidad Autónoma de San Luis Potosí
Environmental Agenda
Interdisciplinary Masters of Resource Efficient Cities



Name of the class: Smart Cities
 Course key: 76979
 Type of course: Optative
 Approved credits:
 Last curriculum revision date: September 2020
 Pre-requisite: None

A) NAME OF THE COURSE: SMART CITIES

Synthetic Program				
Smart Cities				
General Information				
Type of curriculum proposal:	New creation	x	Restructuration	Adjustment
Type of class	Required		Optative	x
			Complementary	
			Other	
Class shared with another EP or academic entity	(X) No () Yes ¿With which PE is shared? _____ ¿Which semester? _____ ¿Which academic entity? _____			
Elaborated by:				
Reviewed by:				
Semester	Hours of theory per week	Hours of practice per week	Hours of additional work per week	Credits
	3	1	1	6
General objective	Learn what is an Smart City and the concepts that make it up as well as understand the roles played by the different communication systems and the importance of this kind of cities .			
Specific professional	<ul style="list-style-type: none"> • Know and analyze the different approaches and lines of work for the implementation of smart cities, from a holistic approach. 			



Synthetic Program		
competence (s) for which the class contributes.		
Practices of the specific professional competence for which the class contributes	<ul style="list-style-type: none"> • Students will be able to perform tasks to analyze problems related to Smart Cities. • They will hold discussions and defend their views in debates and oral presentations. • They will be able to solve assessment tests. • They will analyze scientific, academic and dissemination literature. • They will use information and communication technology in the learning process as a tool to access the globalized world. • They will realize the value of use and the correct management of knowledge. 	
Professional transversal (s) competence (s) for which the class contributes	<ul style="list-style-type: none"> • Students will participate in actions in favor of equal opportunities that improve the quality of urban situations. • They will use in a responsible manner the natural and technological resources related to the implementation and operation of computer systems related to Smart Cities. • Graduates will learn to communicate in a transdisciplinary environment. 	
Units	Units	Content
	1. Concepts of a Smart City	What is a Smart City? Application sectors of a Smart city
	2. IoT, Big Data and Digital Support Technologies	Internet of Things Big data Most common uses of ICT in smart cities
	3. Resource management in Smart Cities	Energy The digital age Communications
	4. Infrastructure and Government of a Smart City	Smart birds Energy saving Mobility and transport
	5. Introduction to the digital economy	Digital Economy Generation of new projects Conditions conducive to sustainable development
	6. Challenges and opportunities of Smart Cities	Challenges for Smart Cities Opportunities for improvement in smart city systems



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Method and practice	Method	The topics to be discussed in each teaching unit will be presented in face-to-face sessions through the use of visual audio material (presentations, videos, etc.) . The majority of the presentations will be exhibited by the holder of the subject and in some cases the students of the course will present works related to the corresponding subjects previous commissioned by the holder.	
	Practice		
Evaluation method	Partial Exam	20%	Units 1 and 2
		20%	Units 3 and 4
		20%	Units 5 and 6
	Final exam	Final project: 20%	
	Other activities	Publication article: 20%	



Bibliography and digital resources	Bibliography	<p>Ahuja, K., & Khosla, A. (2019). Network selection criterion for ubiquitous communication provisioning in smart cities for smart energy system. <i>Journal of Network and Computer Applications</i>, 127, 82–91. https://doi.org/10.1016/J.JNCA.2018.11.011</p> <p>Alamaniotis, M., Bourbakis, N., & Tsoukalas, L. H. (2019). Enhancing privacy of electricity consumption in smart cities through morphing of anticipated demand pattern utilizing self-elasticity and genetic algorithms. <i>Sustainable Cities and Society</i>, 46, 101426. https://doi.org/10.1016/J.SCS.2019.101426</p> <p>Anand, P. B., & Navío-Marco, J. (2018). Governance and economics of smart cities: opportunities and challenges. <i>Telecommunications Policy</i>, 42(10), 795–799. https://doi.org/10.1016/J.TELPOL.2018.10.001</p> <p>Appio, F. P. (2019). Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. <i>Technological Forecasting and Social Change</i>, 142, 1–14. https://doi.org/10.1016/J.TECHFORE.2018.12.018</p> <p>Avancini, D. B., Rodrigues, J. J. P. C., Martins, S. G. B., Rabêlo, R. A. L., Al-Muhtadi, J., & Solic, P. (2019). Energy meters evolution in smart grids: A review. <i>Journal of Cleaner Production</i>, 217, 702–715. https://doi.org/10.1016/J.JCLEPRO.2019.01.229</p> <p>Azunre, G. A., Amponsah, O., Peprah, C., Takyi, S. A., & Braimah, I. (2019). A review of the role of urban agriculture in the sustainable city discourse. <i>Cities</i>, 93(April), 104–119. https://doi.org/10.1016/j.cities.2019.04.006</p> <p>Bouskela, M., Casseb, M., Bassi, S., De Luca, C., & Facchina, M. (2016). La ruta hacia las smart cities: Migrando de una gestión tradicional a plusvalías: el caso de la recuperación del frente costero del río la ciudad inteligente (Banco Inte; S. Bassi & C. De Luca, Eds.). Retrieved from https://publications.iadb.org/bitstream/handle/11319/7743/La-</p>
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		<p>ruta-hacia-las-smart-cities-Migrando-de-una-gestion-tradicional-a-la-ciudad-inteligente.pdf?sequence=10&isAllowed=y</p> <p>Braun, T., Fung, B. C. M., Iqbal, F., & Shah, B. (2018). Security and privacy challenges in smart cities. <i>Sustainable Cities and Society</i>, 39, 499–507. https://doi.org/10.1016/J.SCS.2018.02.039</p> <p>Bruneo, D., Distefano, S., Giacobbe, M., Longo Minnolo, A., Longo, F., Merlino, G., ... Tapas, N. (2019). An IoT service ecosystem for Smart Cities: The #SmartME project. <i>Internet of Things</i>, 5, 12–33. https://doi.org/10.1016/J.IOT.2018.11.004</p> <p>Camero, A., & Alba, E. (2019). Smart City and information technology: A review. <i>Cities</i>, 93, 84–94. https://doi.org/10.1016/J.CITIES.2019.04.014</p> <p>Corsini, F., Certomà, C., Dyer, M., & Frey, M. (2019). Participatory energy: Research, imaginaries and practices on people' contribute to energy systems in the smart city. <i>Technological Forecasting and Social Change</i>, 142, 322–332. https://doi.org/10.1016/J.TECHFORE.2018.07.028</p> <p>Garifova, L. F. (2015). Infonomics and the Value of Information in the Digital Economy. <i>Procedia Economics and Finance</i>, 23, 738–743. https://doi.org/10.1016/S2212-5671(15)00423-2</p> <p>Gutman, P. (1987). <i>Urban agriculture : the potential and limitations of an urban self-reliance strategy</i>. 9(2), 1–6.</p> <p>Haarstad, H., & Wathne, M. W. (2019). Are smart city projects catalyzing urban energy sustainability? <i>Energy Policy</i>, 129, 918–925. https://doi.org/10.1016/J.ENPOL.2019.03.001</p> <p>Jan, M. A., Zhang, W., Usman, M., Tan, Z., Khan, F., & Luo, E. (2019). SmartEdge: An end-to-end encryption framework for an edge-enabled smart city application. <i>Journal of Network and</i></p>



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		<p>for <i>Sustainable Development</i>, 33(4), 695–720. https://doi.org/10.1007/s13593-013-0143-z</p> <p>Osman, A. M. S. (2019). A novel big data analytics framework for smart cities. <i>Future Generation Computer Systems</i>, 91, 620–633. https://doi.org/10.1016/J.FUTURE.2018.06.046</p> <p>Sarkheyli, A., & Sarkheyli, E. (2019). Smart Megaprojects in Smart Cities, Dimensions, and Challenges. <i>Smart Cities Cybersecurity and Privacy</i>, 269–277. https://doi.org/10.1016/B978-0-12-815032-0.00019-6</p> <p>Sepasgozar, S. M. E., Hawken, S., Sargolzaei, S., & Foroozanfa, M. (2019). Implementing citizen centric technology in developing smart cities: A model for predicting the acceptance of urban technologies. <i>Technological Forecasting and Social Change</i>, 142, 105–116. https://doi.org/10.1016/J.TECHFORE.2018.09.012</p> <p>Shen, L., Huang, Z., Wong, S. W., Liao, S., & Lou, Y. (2018). A holistic evaluation of smart city performance in the context of China. <i>Journal of Cleaner Production</i>, 200, 667–679. https://doi.org/10.1016/J.JCLEPRO.2018.07.281</p> <p>Sodhro, A. H., Pirbhulal, S., Luo, Z., & de Albuquerque, V. H. C. (2019). Towards an optimal resource management for IoT based Green and sustainable smart cities. <i>Journal of Cleaner Production</i>, 220, 1167–1179. https://doi.org/10.1016/J.JCLEPRO.2019.01.188</p> <p>Toriz Ramos, C. (2019). Democracy and governance in the smart city. <i>Smart Cities: Issues and Challenges</i>, 17–30. https://doi.org/10.1016/B978-0-12-816639-0.00002-8</p> <p>Tranos, E., & Nijkamp, P. (2013). Accessibility of cities in the digital economy. <i>Cities</i>, 30, 59–67. https://doi.org/10.1016/J.CITIES.2012.03.001</p>



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		<p>van den Buuse, D., & Kolk, A. (2019). An exploration of smart city approaches by international ICT firms. <i>Technological Forecasting and Social Change</i>, 142, 220–234. https://doi.org/10.1016/J.TECHFORE.2018.07.029</p> <p>Wang, S. J., & Moriarty, P. (2019). Energy savings from Smart Cities: A critical analysis. <i>Energy Procedia</i>, 158, 3271–3276. https://doi.org/10.1016/J.EGYPRO.2019.01.985</p> <p>Zheng, H., Chang, W., & Wu, J. (2019). Traffic flow monitoring systems in smart cities: Coverage and distinguishability among vehicles. <i>Journal of Parallel and Distributed Computing</i>, 127, 224–237. https://doi.org/10.1016/J.JPDC.2018.07.008</p>



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	Digital Resources	<p>Ahuja, K., & Khosla, A. (2019). Network selection criterion for ubiquitous communication provisioning in smart cities for smart energy system. <i>Journal of Network and Computer Applications</i>, 127, 82–91. https://doi.org/10.1016/J.JNCA.2018.11.011</p> <p>Alamaniotis, M., Bourbakis, N., & Tsoukalas, L. H. (2019). Enhancing privacy of electricity consumption in smart cities through morphing of anticipated demand pattern utilizing self-elasticity and genetic algorithms. <i>Sustainable Cities and Society</i>, 46, 101426. https://doi.org/10.1016/J.SCS.2019.101426</p> <p>Anand, P. B., & Navío-Marco, J. (2018). Governance and economics of smart cities: opportunities and challenges. <i>Telecommunications Policy</i>, 42(10), 795–799. https://doi.org/10.1016/J.TELPOL.2018.10.001</p> <p>Appio, F. P. (2019). Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. <i>Technological Forecasting and Social Change</i>, 142, 1–14. https://doi.org/10.1016/J.TECHFORE.2018.12.018</p> <p>Avancini, D. B., Rodrigues, J. J. P. C., Martins, S. G. B., Rabêlo, R. A. L., Al-Muhtadi, J., & Solic, P. (2019). Energy meters evolution in smart grids: A review. <i>Journal of Cleaner Production</i>, 217, 702–715. https://doi.org/10.1016/J.JCLEPRO.2019.01.229</p> <p>Azunre, G. A., Amponsah, O., Peprah, C., Takyi, S. A., & Braimah, I. (2019). A review of the role of urban agriculture in the sustainable city discourse. <i>Cities</i>, 93(April), 104–119. https://doi.org/10.1016/j.cities.2019.04.006</p> <p>Bouskela, M., Casseb, M., Bassi, S., De Luca, C., & Facchina, M. (2016). La ruta hacia las smart cities: Migrando de una gestión tradicional a plusvalías: el caso de la recuperación del frente costero del río la ciudad inteligente (Banco Inte; S. Bassi & C. De Luca, Eds.). Retrieved from https://publications.iadb.org/bitstream/handle/11319/7743/La-</p>



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B) CONTENTS AND METHODS BY UNITS AND TOPICS

Unit 1. Concepts of a Smart City		8 h
Topic 1.1 What is a Smart City?		4 h
Subtopic	1.1.1 What is a city? 1.1.2 Definition and history of Smart City	
Topic 1.2 Application sectors of a Smart city		4 h
Subtopic	1.2.1 Examples of application of systems of a Smart city 1.2.2 The need for smart cities 1.2.3 Problems involved in the application of systems for smart cities 1.2.1 Examples of application of systems of a Smart city	



Bibliography and digital resources	Bibliography
	<p>Azunre, G. A., Amponsah, O., Peprah, C., Takyi, S. A., & Braimah, I. (2019). A review of the role of urban agriculture in the sustainable city discourse. <i>Cities</i>, 93(April), 104–119. https://doi.org/10.1016/j.cities.2019.04.006</p> <p>Bouskela, M., Casseb, M., Bassi, S., De Luca, C., & Facchina, M. (2016). <i>La ruta hacia las smart cities: Migrando de una gestión tradicional a plusvalías: el caso de la recuperación del frente costero del río la ciudad inteligente</i> (Banco Inte; S. Bassi & C. De Luca, Eds.). Retrieved from https://publications.iadb.org/bitstream/handle/11319/7743/La-ruta-hacia-las-smart-cities-Migrando-de-una-gestion-tradicional-a-la-ciudad-inteligente.pdf?sequence=10&isAllowed=y</p> <p>Gutman, P. (1987). <i>Urban agriculture : the potential and limitations of an urban self-reliance strategy</i>. 9(2), 1–6.</p> <p>Jan, M. A., Zhang, W., Usman, M., Tan, Z., Khan, F., & Luo, E. (2019). SmartEdge: An end-to-end encryption framework for an edge-enabled smart city application. <i>Journal of Network and Computer Applications</i>, 137, 1–10. https://doi.org/10.1016/J.JNCA.2019.02.023</p> <p>Korth, M., Stewart, R., Langer, L., Madinga, N., Rebelo Da Silva, N., Zaranyika, H., ... De Wet, T. (2014). What are the impacts of urban agriculture programs on food security in low and middle-income countries: A systematic review. <i>Environmental Evidence</i>, 3(1), 1–10. https://doi.org/10.1186/2047-2382-3-21</p> <p>López Alvarado, A. R. (2018). Ciudad inteligente y sostenible: hacia un modelo de innovación inclusiva. <i>Paakt: Revista de Tecnología y Sociedad</i>, 7(13), 1–17. https://doi.org/10.18381/Pk.a7n13.299</p> <p>Orsini, F., Kahane, R., Nono-Womdim, R., & Gianquinto, G. (2013). Urban agriculture in the developing world: A review. <i>Agronomy</i></p>



		<p>for <i>Sustainable Development</i>, 33(4), 695–720. https://doi.org/10.1007/s13593-013-0143-z</p> <p>Sepasgozar, S. M. E., Hawken, S., Sargolzaei, S., & Foroozanfa, M. (2019). Implementing citizen centric technology in developing smart cities: A model for predicting the acceptance of urban technologies. <i>Technological Forecasting and Social Change</i>, 142, 105–116. https://doi.org/10.1016/J.TECHFORE.2018.09.012</p> <p>Shen, L., Huang, Z., Wong, S. W., Liao, S., & Lou, Y. (2018). A holistic evaluation of smart city performance in the context of China. <i>Journal of Cleaner Production</i>, 200, 667–679. https://doi.org/10.1016/J.JCLEPRO.2018.07.281</p>
	Digital resources	<p>ADVIDS. (2017). 20 Brilliant Smart City Video Examples. Retrieved June 25, 2019, from https://blog.advids.co/20-brilliant-smart-city-video-examples/</p> <p>Local Governments for Sustainability, S. A. (2016). Smart City Webtool. Retrieved June 25, 2019, from http://smartcitywebtool.org/</p>
Teaching methods	Presentation of the topics through videos, power point presentations and readings	
Learning activities	Field work Oral presentations Investigation project	

Unit 2. IoT, Big Data and Digital Support Technologies		8 h
Topic 2.1 Internet of things		3 h
Subtopic	2.1.1 Definition and history of IoT 2.1.2 Examples of application in smart cities	
Topic 2.2 Big Data		3 h
Subtopic	2.2.1 Definition of Big Data 2.2.2 Systems for handling large amounts of data and their visualization	



Topic 2. 3 Most common uses of ICT in smart cities		2 h
Subtopic	2.3.1 Examples	
Bibliography and digital resources	Bibliography	<p>Bruneo, D., Distefano, S., Giacobbe, M., Longo Minnolo, A., Longo, F., Merlino, G., ... Tapas, N. (2019). An IoT service ecosystem for Smart Cities: The #SmartME project. <i>Internet of Things</i> , 5 , 12–33. https://doi.org/10.1016/J.IOT.2018.11.004</p> <p>Camero, A., & Alba, E. (2019). Smart City and information technology: A review. <i>Cities</i> , 93 , 84–94. https://doi.org/10.1016/J.CITIES.2019.04.014</p> <p>Lau, BPL, Marakkalage, SH, Zhou, Y., Hassan, NU, Yuen, C., Zhang, M., & Tan, U.-X. (2019). A survey of data fusion in smart city applications. <i>Information Fusion</i> , 52 , 357–374. https://doi.org/10.1016/J.INFFUS.2019.05.004</p> <p>Lim, C., Kim, K.-J., & Maglio, PP (2018). Smart cities with big data: Reference models, challenges, and considerations. <i>Cities</i> , 82 , 86–99. https://doi.org/10.1016/J.CITIES.2018.04.011</p> <p>Osman, AMS (2019). A novel big data analytics framework for smart cities. <i>Future Generation Computer Systems</i> , 91 , 620–633. https://doi.org/10.1016/J.FUTURE.2018.06.046</p> <p>Sodhro, AH, Pirbhulal, S., Luo, Z., & Albuquerque, VHC (2019). Towards an optimal resource management for IoT based Green and sustainable smart cities. <i>Journal of Cleaner Production</i> , 220 , 1167–1179. https://doi.org/10.1016/J.JCLEPRO.2019.01.188</p> <p>van den Buuse, D., & Kolk, A. (2019). An exploration of smart city approaches by international ICT companies. <i>Technological Forecasting and Social Change</i> , 142 , 220–234. https://doi.org/10.1016/J.TECHFORE.2018.07.029</p>
	Digital resources	<p>Aher, B. (2018). How Big Data Impacts Smart Cities. Retrieved June 25, 2019, from DZone Big Data website: https://dzone.com/articles/how-big-data-has-the-biggest-impact-in-smart-citie</p>
Teaching methods	Presentation of the topics through videos, power point presentations and readings.	
Learning activities	Field work Oral presentations Investigation project	



Unit 3. Resource management in Smart Cities		8 h
Topic 3.1 Energy		3 h
Subtopic	3.1.1 The importance of reducing consumption in a smart city	
Topic 3.2 The digital age		2 h
Subtopic	3.2.1 The importance of all systems being connected to each other	
Topic 3.3 Communications		3 h
Subtopic	3.3.1 Collection and application of data obtained from indicators	
Bibliography and digital resources	Bibliography	<p>Ahuja, K., & Khosla, A. (2019). Network selection criterion for ubiquitous communication provisioning in smart cities for smart energy system. <i>Journal of Network and Computer Applications</i> , 127 , 82–91. https://doi.org/10.1016/J.JNCA.2018.11.011</p> <p>Haarstad, H., & Wathne, MW (2019). Are smart city projects catalyzing urban energy sustainability? <i>Energy Policy</i> , 129 , 918-925. https://doi.org/10.1016/J.ENPOL.2019.03.001</p>
	Digital resources	<p>Quantic (2017). Big Data in the construction of Smart Cities. Retrieved June 25, 2019, from Quantic Solutions website: https://www.quanticsolutions.es/blog/big-data-smart-cities/</p>
Teaching methods	Presentation of the topics through videos, power point presentations and readings.	
Learning activities	Field work Oral presentations Investigation project	

Unit 4. Infrastructure and Government of a Smart City		8 h
Topic 4.1 Smart Grids		3 h
Subtopic	4.1.1 Definition of Smart Grids 4.1.2 Examples of the possible application and necessary infrastructure	
Topic 4.2 Energy saving		2 h
Subtopic	4.2.1 The importance of reducing electricity consumption	
Topic 4.3 Mobility and Transportation		3 h
Subtopic	4.3.1 Examples of bad transport systems 4.3.2 Infrastructure for autonomous and electrical transport systems	



	4.3.3 Consumption and pressure self-regulation systems	
Bibliography and digital resources	Bibliography	<p>Alamaniotis, M., Bourbakis, N., & Tsoukalas, LH (2019). Enhancing privacy of electricity consumption in smart cities through morphing of anticipated demand pattern utilizing self-elasticity and genetic algorithms. <i>Sustainable Cities and Society</i>, 46, 101426. https://doi.org/10.1016/J.SCS.2019.101426</p> <p>Avancini, DB, Rodrigues, JJPC, Martins, SGB, Rabêlo, RAL, Al-Muhtadi, J., & Solic, P. (2019). Energy meters evolution in smart grids: A review. <i>Journal of Cleaner Production</i> , 217 , 702–715. https://doi.org/10.1016/J.JCLEPRO.2019.01.229</p> <p>Corsini, F., Certomà, C., Dyer, M., & Frey, M. (2019). Participatory energy: Research, imaginaries and practices on people 'contribute to energy systems in the smart city. <i>Technological Forecasting and Social Change</i> , 142 , 322-332. https://doi.org/10.1016/J.TECHFORE.2018.07.028</p> <p>Zheng, H., Chang, W., & Wu, J. (2019). Traffic flow monitoring systems in smart cities: Coverage and distinguishability among vehicles. <i>Journal of Parallel and Distributed Computing</i> , 127 , 224-237. https://doi.org/10.1016/J.JPDC.2018.07.008</p> <p>Wang, SJ, & Moriarty, P. (2019). Energy savings from Smart Cities: A critical analysis. <i>Energy Procedia</i> , 158 , 3271–3276. https://doi.org/10.1016/J.EGYPRO.2019.01.985</p>
	Digital resources	<p>Novelec Group (2017). What is and how does a Smart Grid work? Retrieved June 25, 2019, from Grupo Novelec website: https://blog.gruponovelec.com/electricidad/como-funciona-smart-grid/</p>
Teaching methods	Presentation of the topics through videos, power point presentations and readings.	
Learning activities	Field work Oral presentations Investigation project	

Unit 5. Introduction to the digital economy		8 h
Topic 5.1 Digital Economy		3 h
Subtopic	5.1.1 Definition of Digital Economy 5.1.2 Fundamental components	
Topic 5.2 Generation of new projects		2 h
Subtopic	5.2.1 Infrastructure and tools for the development of new projects	



Topic 5.3 Conditions conducive to sustainable development		3 h
Subtopic	5.3.1 Benefits of the digital economy 5.3.2 Risks of the digital economy	
Bibliography and digital resources	Bibliography	<p>Garifova, LF (2015). Infonomics and the Value of Information in the Digital Economy. <i>Procedia Economics and Finance</i> , 23 , 738–743. https://doi.org/10.1016/S2212-5671(15)00423-2</p> <p>Kostakis, V., Roos, A., & Bauwens, M. (2016). Towards a political ecology of the digital economy: Socio-environmental implications of two competing value models. <i>Environmental Innovation and Societal Transitions</i>, 18, 82–100. https://doi.org/10.1016/J.EIST.2015.08.002</p> <p>Miller, P., & Wilsdon, J. (2001). Digital Futures - An Agenda for a Sustainable Digital Economy. <i>Corporate Environmental Strategy</i> , 8 (3), 275-280. https://doi.org/10.1016/S1066-7938(01)00116-6</p> <p>Tranos, E., & Nijkamp, P. (2013). Accessibility of cities in the digital economy. <i>Cities</i> , 30 , 59–67. https://doi.org/10.1016/J.CITIES.2012.03.001</p>
	Digital resources	SicaSoft (2016). Smart City: a concept of sustainable development. Retrieved June 25, 2019, from Sicasoft website: http://sicasoft.com/s/smart-city-una-aproximacion-al-concepto-de-desarrollo-sostenible/
Teaching methods	Presentation of the topics through videos, power point presentations and readings.	
Learning activities	Field work Oral presentations Investigation project	

Unit 6. Challenges and opportunities of Smart Cities		8 h
Topic 6.1 Challenges for Smart Cities		4 h
Subtopic	6.1.1 Major problems 6.1.2 Examples of bad application systems in a smart city	
Topic 6.2 Opportunities for improvement in smart city systems		4 h
Subtopic	6.2.1 Systems for the development of intelligent ecosystems	
Bibliography and digital resources	Bibliography	Anand, PB, & Navío-Marco, J. (2018). Governance and economics of smart cities: opportunities and



		<p>challenges. <i>Telecommunications Policy</i>, 42 (10), 795–799. https://doi.org/10.1016/J.TELPOL.2018.10.001</p> <p>Appio, FP (2019). Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. <i>Technological Forecasting and Social Change</i>, 142, 1–14. https://doi.org/10.1016/J.TECHFORE.2018.12.018</p> <p>Braun, T., Fung, BCM, Iqbal, F., & Shah, B. (2018). Security and privacy challenges in smart cities. <i>Sustainable Cities and Society</i>, 39, 499–507. https://doi.org/10.1016/J.SCS.2018.02.039</p> <p>Sarkheyli, A., & Sarkheyli, E. (2019). Smart Megaprojects in Smart Cities, Dimensions, and Challenges. <i>Smart Cities Cybersecurity and Privacy</i>, 269–277. https://doi.org/10.1016/B978-0-12-815032-0.00019-6</p> <p>Toriz Ramos, C. (2019). Democracy and governance in the smart city. <i>Smart Cities: Issues and Challenges</i>, 17–30. https://doi.org/10.1016/B978-0-12-816639-0.00002-8</p>
	Digital resources	<p>Ramón Duarte, M. (2019). Smart and sustainable cities: strategic challenges 4.0. Retrieved June 25, 2019, from Alainet website: https://www.alainet.org/es/articulo/199447</p>
Teaching methods	Presentation of the topics through videos, power point presentations and readings.	
Learning activities	Field work Oral presentations Investigation project	

C) TEACHING AND LEARNING STRATEGIES

The topics to be discussed in each teaching unit will be presented in face-to-face sessions through the use of audiovisual material (presentations, videos, etc.). The majority of the presentations will be exhibited by the holder of the subject and in some cases the students of the course will present works related to the corresponding subjects previous commissioned by the holder.

Each student must read the specific article for the class and prepare a reading control in which, in addition to indicating key concepts and demonstrating their mastery, they must express their opinion, experiences, doubts and / or thoughts.

D) EVALUATION AND ACCREDITATION



Preparation and / or presentation of:	Periodicity	Covers	Weighting of each partial in relation to the ordinary
First partial exam: Oral essay presentation	At the end of Unit 2	Units 1 to 2	20%
Second partial exam: Written essay presentation	At the end of Unit 4	Units 3 to 4	20%
Third partial exam: Final essay presentation	At the end of Unit 6	Unit 5 and 6	20%
Final project	At the end of the units	Units 1 to 6	20%
Publication article (draft)	At the end of the units	Unit 1 to 6	20%
TOTAL			100 %
Ordinary exam	The ordinary final grade will consist of the 3 partial ratings (60%), presentation of the final project (20%) and the rating of the publication article (20%).		
Other academic activities required	Special non-mandatory activities will not have a value in the partial evaluation. This consists of attending special events on the subject or participation as organizers in events of the discipline, whether from the Faculty or outside it as dissemination and training activities		

E) BIBLIOGRAPHY AND DIGITAL RESOURCES

Basic Texts

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