

Academic Year: ( 2019 / 2020 )

Review date: 05-05-2020

Department assigned to the subject:

Coordinating teacher: GARCIA RUBIO, CARLOS

Type: Electives ECTS Credits : 6.0

Year : 1 Semester : 2

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Students taking this course are expected to have prior knowledge on fundamentals of security and the Network, Transport and Application Layers of the TCP/IP model.

**OBJECTIVES**

After finishing the course, students will be able to:

- Understand the concept of Ubiquitous computing, with a focus on its security, mobility and usability challenges, their limits in the current Internet and their evolution trends.
- State of the art knowledge on identity management, trust, reputation, authorization and risk management in the Future Internet.
- State of the art knowledge on mobility: service, user, terminal mobility and localization.
- State of the art knowledge on usability, focusing on power consumption, movement and user behavior prediction, user customization and social immersion.

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Fundamental aspects of security on Ubiquitous Computing and the Future Internet: Authentication, authorization, identity management, trust and reputation and Privacy. Usability.
2. Next generation protocols for the higher Layers: Survey of Internet of Things, Application Layer Protocols for the Internet of Things, Service Discovery Protocols, Transport Layer Security in IoT, TCP evolution, Controlling Queue Delay.
3. Context aware applications: localization, power consumption, long fat network performance, user customization, information dissemination.

**LEARNING ACTIVITIES AND METHODOLOGY**

Students will submit a report and make a public presentation, deepening on one of the topics from the course (1 ECTS credit).

**ASSESSMENT SYSTEM**

Ordinary examination: Up to 50% of the the total grade for practical assignments and a report and public presentation.  
Extraordinary examination: 100% final exam.

<b>% end-of-term-examination:</b>	50
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	50

**BASIC BIBLIOGRAPHY**

- A. Al-Fuqaha, M. Guizani, M. Mohammadi, M. Aledhari and M. Ayyash "Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications," , IEEE Communications Surveys & Tutorials, vol. 17, no. 4, pp. 2347-2376, Fourthquarter 2015
- D. Hankerson, A. Menezes, S. Vanstone Guide to Elliptic Curve Cryptography,, Springer,, 2004.
- Gopalratnam, K.; Cook, D.J., "Online Sequential Prediction via Incremental Parsing: The Active LeZi Algorithm," , in Intelligent Systems, IEEE , vol.22, no.1, pp.52-58, , Jan.-Feb. 2007
- J. H. Silverman An Introduction to the Theory of Elliptic Curves, Summer School on Computational Number Theory and Applications to Cryptography, 2006.
- OASIS eXtensible Access Control Markup Language (XACML) Version 3.0 Specification. , OASIS Standard. , January 2013
- OASIS Security Assertion Markup Language (SAML) Version 2.0 Specification. , OASIS Standard. ,

March 2005

- Rahman,Wang Resource Discovery of IoT, The Internet Protocol Journal, Volume 19, No. 2, June 2016
- Shelby, Z., Hartke, K., and C. Bormann The Constrained Application Protocol (CoAP), RFC 7252, June 2014
- V. Karagiannis, P. Chatzimisios, F. Vázquez-Gallego, J. Alonso-Zarate A Survey on Application Layer Protocols for the Internet of Things, ransaction on IoT and Cloud Computing, Vol. 1, No. 1, January 2015
- Villaverde, B.C.; De Paz Alberola, R.; Jara, A.J.; Fedor, S.; Das, S.K.; Pesch, D. Service Discovery Protocols for Constrained Machine-to-Machine Communications, Communications Surveys & Tutorials, IEEE , vol.16, no.1, pp.41-60, First Quarter 2014

#### ADDITIONAL BIBLIOGRAPHY

- G. Huston TCP Protocol Wars, Internet Protocol Journal, Volume 18, Number 2, June 2015
- N. Cardwell, Y. Cheng, C. S. Gunn, S. H. Yeganeh, V. Jacobson BBR: Congestion-Based Congestion Control, ACM Queue, vol. 14, September-October 2016
- Subir Varma Internet Congestion Control, Morgan Kaufmann Publishers Inc., San Francisco, CA, 2015