Mobility, security and usability aspects in ubiquitous computing and the future internet

Academic Year: (2020 / 2021) **Review date: 22-01-2021**

Department assigned to the subject:

Coordinating teacher: SANCHEZ GUERRERO, ROSA MARIA

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. Introduction to Ubiquitous Computing: concepts and challenges
2. Security in Pervasive Computing. Access control systems & languages.
3. Identity & Identity Management.
4. Privacy Issues in Pervasive Computing
5. Application Layer Protocols for the IoT
6. Usability issues in Pervasive Computing

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

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

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