UAB
Universitat Autònoma de Barcelona

2018/2019

Standards in eHealth and Interoperability

Code: 44020
ECTS Credits: 6

Degree	Type	Year	Semester
4316624 Internet of Things for e-Health	OB	0	1

Contact

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Teachers

Joan Bartrina Rapesta

Carlos Borrego Iglesias

Use of languages

Principal working language: english (eng)

Prerequisites

There are no previous requirements.

Objectives and Contextualisation

The goal of this subject is to provide an introduction to standards, communication protocols and security protocols concerning Internet-of-Things for E-Health.

Skills

- Apply basic research tools in the area of IoT in health.
- Apply the ethical rules applicable in the health sector.
- Apply the local, autonomic, national and international regulations in the area of IoT in health.
- Apply the operation and organisation of internet, communications technologies and protocols and new generation networks to the area of health and health provision.
- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Identify care procedures in the health system and the factors for their digital transformation to a more efficient model for professionals and patients.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.

Learning outcomes

1. Analyse and evaluate the requirements of communication technologies and protocols.
2. Apply basic research tools in the area of IoT in health.
3. Apply the local, autonomic, national and international regulations in the area of IoT in health.
4. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.

5. Identify the standards that facilitate the acceleration of digital transformation towards a more efficient relationship model for professionals and patients.
6. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
7. Understand protocolised healthcare procedures through standard healthcare and health-system procedures.
8. Understand the processes of product standardisation and certification.
9. Use the corresponding ethics committees in the health sector for approving studies, procedures and developments.

Content

1. Emerging Trends in Electronic Health Care
2. E-health Standards Institutions
3. HL7: Electronic Health Information Systems
4. DICOM: Digital Imaging and Communications in Medicine
5. Communication standards: JPEG
6. Communication standards: JPEG-LS
7. Communication standards: JPEG2000
8. Digital Video Compression Standards
9. Communications standards: H.264
10. Standards for Privacy, Security and Safety
11. Building blocks for Information Security
12. Communication systems for IoT
13. Wireless networks
14. Opportunistic Networking

Methodology

The methodology will combine the attended lectures, laboratory sessions, homework derived from recommended readings and the independent work of the student. Students may have to give an oral presentation on specific subjects related to the works introduced and discussed along the course.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Laboratory Sessions	15	0.6	1, 2, 3, 4, 5, 6, 7, 8, 9
Lectures	30	1.2	1, 2, 3, 4, 5, 6, 7, 8, 9
Type: Supervised			
Laboratory Sessions Preparation	25	1	1, 2, 4, 5, 6, 8
Type: Autonomous			
Homework: resolution of exercises, reading of journal papers or technical reports, preparation of sessions	35	1.4	1, 2, 3, 4, 5, 6, 7, 8, 9
Preparation of synthesis test	15	0.6	1, 2, 3, 4, 5,

				6, 7, 8, 9
Preparation of written reports	25	1		1, 2, 3, 4, 5, 6, 7, 8, 9

Evaluation

The final evaluation mark will take into account the portfolio delivered by the students, the attendance and participation in class, the laboratory sessions and the possible oral presentations.

1. Attendance and active participation are compulsory. At least 80% of the lectures shall be attended. Absences might be compensated with a home-work after agreement with the teacher. Mark: 30% (minimum mark: 5 out of 10).
2. Laboratory sessions. Mark: 30% (minimum mark: 5 out of 10).
3. Homework delivery. Mark: 30% (minimum mark: 5 out of 10).
4. Synthesis test. Mark: 10% (minimum mark: 5 out of 10). May include an oral presentations of a particular subject (presentation in English is compulsory).

To pass the module, a mark equal or higher than 5 in each evaluation activity must be obtained.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Homework Delivery	30	1	0.04	1, 2, 3, 4, 5, 6, 7, 8, 9
Laboratory Sessions	30	1	0.04	1, 2, 4
Participation in class: attendance, contributions, discussion, ..	30	2	0.08	1, 2, 3, 4, 5, 6, 7, 8
Synthesis test	10	1	0.04	1, 2, 3, 4, 5, 6, 7, 8, 9

Bibliography

Robert S. H. Istepanian and Swamy Laxminarayan and Constantinis S. Pattichis (2006). M-health: Emerging Mobile Health Systems, Springer Publisher. ISBN 978-0-387-26558-2.

David A. Clunie (2000). DICOM Structured Reporting. ISBN 097-0-13690-0

Thomas M. Cover and Joy A. Thomas (1991). Elements of Information Theory, John Wiley & Sons, Inc Mark Nelson (1991). The Data Compression Book, Prentice Hall.

David S. Taubman and Michael W. Marcellin (2002). JPEG 2000, Kluwer Academic Publishers. ISBN 0-7923-7519-X.

David Salomon (2006, 4th Edition). Data Compression: The Complete Reference (Hardcover), Springer. ISBN 1-84628-602-5.

David Salomon, Giovanni Motta (2010, 5th Edition). Handbook of Data Compression (Hardcover), Springer. ISBN 978-1-84882-902-2.

Khalid Sayood (2012, 4th Edition). Introduction to Data Compression (Hardcover), Morgan Kaufmann. ISBN 978-0-12-415796-5.

Höller, Jan, David Boyle, Stamatis Karnouskos, Stefan Avesand, Catherine Mulligan, and Vlasios Tsiatsis. *From machine-to-machine to the internet of things*. Cambridge: Academic Press, 2014.

Denko MK, editor. Mobile Opportunistic Networks: Architectures, Protocols and Applications. CRC Press; 2016 Apr 19.

Pahlavan K, Krishnamurthy P. Principles of wireless networks: A unified approach. Prentice Hall PTR; 2011 Aug 30.