

IX.2330 / IX.2430 – Digital Systems for Health

General information

Module Title: Digital for Health Module ID: IX.2330 / IX.2430 Person in charge: Mariam CAMARA ECTS: 5 credits Average amount of work per student: 42 hours supervised + 50 hours Teamwork: yes (in practical work)

Presentation

The objective of this module is to raise students' awareness of the new needs of the computerization of medical data and techniques in hospital environments and more particularly in the improvement of the quality of care and well-being while taking advantage of technological and technical advances in the fields of computer science and telecommunications.

Educational objectives

- Identify the current needs of ICT in selected hospital environments
- Identify and analyze the constraints related to the use of ICT for medical applications
- Evaluate technical solutions for a specific need

Prerequisite

There are no prerequisites.

Content/Program

This module covers:

- The needs of ICT in the field of health and the computerization of data and certain types of care in hospital wards.
- A state of the art of the tools, devices, interfaces and computer methods that are increasingly encountered in hospitals as well as the devices and methods under development. (New medical devices, integrated microsystems for health, smart medicines, imaging and robotics technologies).
- Notions relating to sleep, its pathologies, sleep and vigilance technologies.
- Methods of acquiring and processing biological signals.

Concepts

- The emerging needs of the computerization of hospital care,
- New medical devices present in certain hospital departments,
- New cutting-edge technologies for telemedicine (Integrated Microsystems for Health, Smart Medicines, Imaging and Robotics Technologies).
- Methods of acquiring and processing biological signals.

Tools used

- LabVIEW Software
- The NI Elvis Platform

Pedagogical methods

Learning methods

- The fundamentals are covered in class, associated with conferences with insights from professionals in the medical field.
- Instrumentation labs with LabVIEW software and the Elvis Platform will provide a better understanding of the issues related to the acquisition and processing of biological signals.

Evaluation methods

The evaluation of this module is based on activities in pairs, MCQs at the end of each course and an individual final exam.

- Collective evaluation: work in pairs (30%).
- Intermediate assessment (MCQ): 30%
- Final individual evaluation: 40%

Language of work

- The module is in English

Bibliography, Webography, Other sources

- Software and Tutorials: www.ni.com/iworx
- Jim Fujimoto: invention of OCT: <https://youtu.be/K1KLLM0vnHs>
- W. Ghouali, et al., "Full-field optical coherence tomography of human donor and pathological corneas," *Curr Eye Res* 40, 526-534 (2015).
- <http://www.cea.fr/multimedia/Pages/videos/culture-scientifique/sante-sciences-du-vivant/echographie-ultrasonore.aspx>
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- Anke Neumann. Comparative effectiveness of rosuvastatin versus simvastatin in primary prevention among new users: a cohort study in the French national health insurance database *Pharmacoepidemiol Drug Saf.* 2014 Tue; 23(3): 240–250
- <https://www.ticsante.com/>
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