DYNAMIQUE DES SYSTÈMES BIOLOGIQUES HUMAINS

DYNAMICS OF BIOLOGICAL HUMAN SYSTEMS

Lecturers: Didier DRAGNA, Marc JACOB

| Lecturers : 16.0 | TC : 0.0 | PW : 0.0 | Autonomy : 0.0 | Study : 12.0 | Project : 0.0 | Language : FR

Objectives

The human body is an extraordinary complex dynamic system, whose physical modeling is essentialy multidisciplinary. A large number of regulatory process aim at constantly monitoring the internal environement of the body, what is referred to as the homeostasis. In this course, physical modeling of human biologogical systems are presented. Some current applications in bioengineering (artificial heart, medical robotics and imaging) are introduced.

Keywords : biomechanics, heart, biological system, artificial heart, imaging

Programme

Neuro-musculoskeletal system: strength of materials, rigid and flexible multibody systems, biomaterials..
Cardiovascular system: heart mechanics, circulation, network analysis, articial heart.
Medical robotics
Medical imaging: inverse problems, non-destructive testing, ultrasounds, X-rays, MRI.

Activities: Simulation of the motion with a multibody model. Signal processing for an electrocardiogram. Oral presentation and report on a research article.

Learning outcomes

- Bridging your basic multi-disciplinary training with biomedical engineering.
- Acquire fundamental knowledge in biomedical engineering to master recent and future applications.
- Be able to interact with healthcare professionals on program topics.

Independent study

Objectifs : This activity is not concerned with framed autonomy activities outside personal work.

Méhodes : This activity is not concerned with framed autonomy activities outside personal work.

Core texts

D. A. Neumann, *KINESIOLOGY OF THE MUSCULOSKELETAL SYSTEM. FOUNDATIONS FOR PHYSICAL REHABILITATION.*, McGraw-Hill, 2002
L. Waite *BIOFLUID MECHANICS IN CARDIOVASCULAR SYSTEMS.*, McGraw-Hill, 2006
C. Guy, D. Ffytch*INTRODUCTION TO THE PRINCIPLES OF MEDICAL IMAGING.*, Imperial College Press,, 2005

Assessment

Final mark = 0.5*Knowledge + 0.5*Know-how
Knowledge = final exam
Know-how = 0.5*written reports of BE + 0.5*oral and written presentation of a scientific