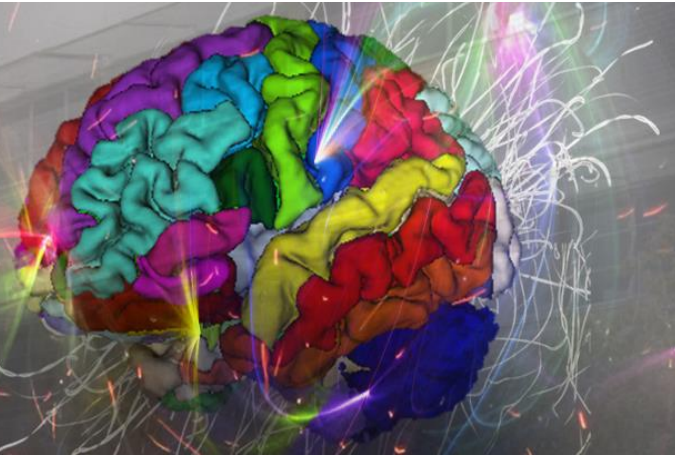




Computer-aided Surgery and **Medical Robotics**

Pere Ridao, Xevi Cufí

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Course presentation

- MR datasheet
- What is MR about?
- Objectives
- Contents & Learning activities & Agenda
- Course evaluation
- Bibliography

Datasheet-1

- Academic Staff
 - Lecturers:
 - Pere Ridao (pere.ridao@udg.edu)
 - Xevi Cufí (xavier.cufi@udg.edu)
 - Invited Professors:
 - Alícia Casals (Technical University of Catalonia, Barcelona)
 - Nicolas García Aracil (Miguel Hernández University, Elche)

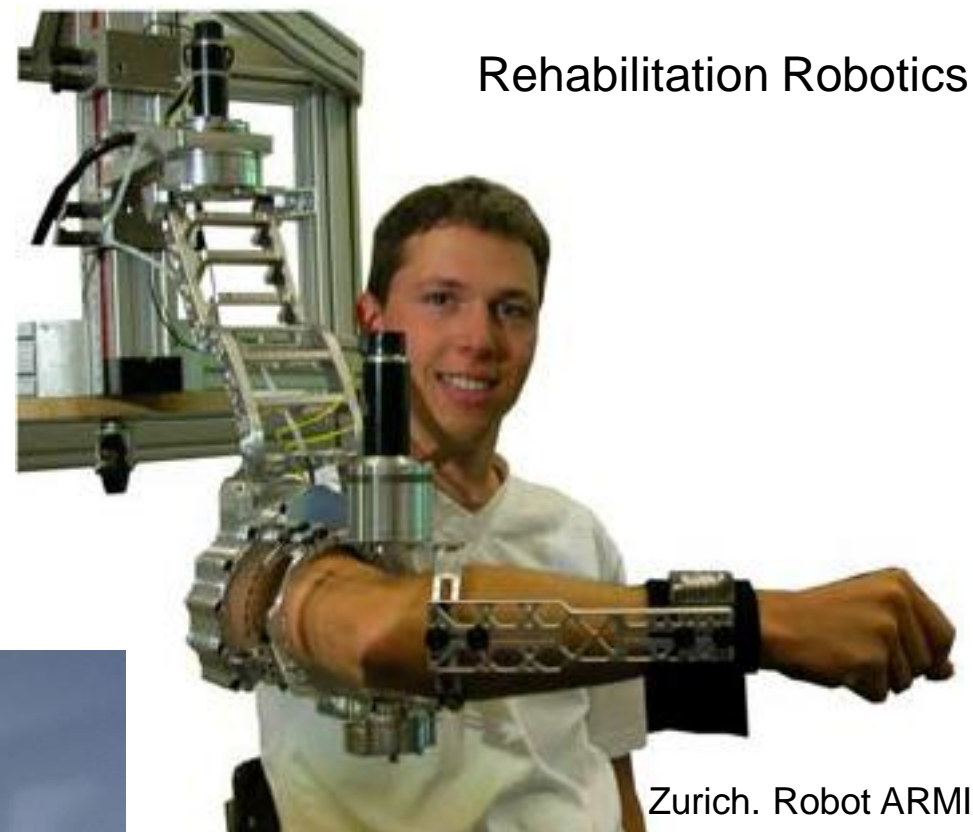
Datasheet-2

- 6 ECTS (150 h)
 - Theory:
 - **Monday 10:00-12:00.** Classroom II.02A (P2 Building)
 - Lab sessions (Robotics Lab – P2 Building):
 - **Wednesday 10:00 – 12:00** (Group 2 – 15 participants)
 - **Thursday 12:00-14:00** (Group 1 – 15 participants)

We are going to re-distribute some of the lectures because the visits of invited professors:

- 10 h of teaching activities Prof. Alícia Casals (6h in Girona and 4h in Barcelona)
- 10 h of teaching activities Prof. Nicolás García Aracil

What is Medical Robotics about?



Objectives

The aim of this course (1):

To have an overview of the application domain and the potential contributions of a robot to the achievement of a medico-surgical operation.

To analyze the constraints of clinical operation and determining the added value of the robot. Regulatory framework useful for engineers or scientists.

To analyze the architecture of most usual medical robotics systems and design approaches.

To analyze the relationship between the different reference frames.

Objectives

The aim of this course (2):

To have an overview of the use of intra-operating imaging for controlling the robot and the mechanical interaction with living tissues.

To be able to analyze tele-operation techniques and co-manipulation.

To understand fundamental concepts about robotic manipulators

To understand fundamental concepts about visual-based control of robot arms in the context of medical applications.

To introduce students to the Robot Operating System (ROS)

Lectures contents

- Introduction to Medical Robotics (4h) (XC)
- Staubli Robotic Systems in the Lab (2h) (XC)
- Fundamental robotic concepts: an overview (2h) (PR)
- Visual Servoing: using optical information to control the robot (2h) (PR)
- Introduction to Robot Operation System (ROS) (2h) (PR)
- Surgical Robotics (10h, Prof. Alícia Casals)
- Rehabilitation Robotics (5h, Prof. García Aracil)
- Assistential Robotics (5h, Prof. García Aracil)

Lab contents

- **Staubli Robotics System (8h/Group)**

Dates: October 10 and 11, October 17 and 18, October 24 and 25, and November 14 and 15.

- **Robot Operating System and Kinematic Control (8h/Group)**

Dates: November 21 and 22, November 28 and 29, December 12 and 13, and December 19 and 20.

- **Visit Medical Robotics Labs in Barcelona** (to be scheduled, you will be informed)
- **Visit Da Vinci Robot facilities in Hospital Josep Trueta in Girona** (to be scheduled, you will be informed)

Lecture activity

Lectures (oral presentations) given by students (groups provided by teachers) week: January 7 -11, 2019

- 15' problem statement delivery
- 2h searching for additional information (group)
- 2h reviewing and understanding the info (group)
- 2h searching for consensus. Preparation of 1st draft doc (group)
- 30' control with teachers
- 7h doc and presentation preparation (group)
- 15' last review of doc and presentation
- 2h last corrections and tests (group)
- 4h classroom presentation

Calendar

setembre 2018						
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desembre 2018						
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31						

Lecture Activity: January 7 -11 and 14 – 18, 2019

Pending: Invited professors activities, and Visit Da Vinci Facilities

Evaluation

- **Final Mark (FM):**
 - Lab sessions (50%)
 - Extra works (invited professors proposals) (20%)
 - Lecture activity (30%)
- Evaluation criteria:
 - For labs: 70% strategy and results + 30% document
 - For lecture activity: 50% document + 50% presentation and interaction
- Please, plan your deadlines!

Bibliography

- *Medical Robotics*, Jocelyne Troccaz. Wiley-ISTE, 2012. ISBN: 978-1-84821-334-0
- *Robótica Médica. Notas prácticas para el aprendizaje de la robótica en bioingeniería* . Consorcio OPENSURG. Acción CYTED 509AC0372. 2013. ISBN: 978-84-15413-12-7
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