

## Robotic Intelligence

**Credits: 4 Semester 3 UJI Compulsory: Yes**

<b>Format</b>	Lectures 20 h	Examples 15 h	Private study 80 h
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**Lecturer: A. P. del Pobil**

Introduction to the topic of Machine Intelligence, understood as part of artificial intelligence that deals with those aspects of intelligence related to physical systems that interact in the real world. This intelligent behavior includes objectives such as: adaptation to a changing environment, active perception to interact with a partially unknown environment, explore, to learn, etc.

**Contents:**

1. The study of intelligence. Fundamentals and panoramic
2. Robot intelligence: the basics
3. Neural networks for adaptive behavior
4. Braitenberg vehicles and arquitetura of Subsumption
5. Development: From locomotion to cognition
6. Evolution, genetic algorithms and self-organizing
7. Design principles of autonomous robots

**Objectives:** To acquire the basic principles and practices necessary skills to design and build a robotic system capable of displaying an appropriate and robust behavior in a realistic environment.

**Assessment:** 100% from student projects.

**Practical Work:** Laboratory exercises on modelling and development of intelligent systems

**Recommended texts:**

- Rolf Pfeifer and Josh C. Bongard, How the Body Shapes the Way We Think - A New View of Intelligence, The MIT Press, 2006.
- Rolf Pfeifer and Christian Scheier, Understanding Intelligence, The MIT Press, 1999.
- Stuart J. Russell and Peter Norvig, Artificial Intelligence - A Modern Approach, Prentice Hall, Second Edition, New Jersey, 2003
- Michael A. Arbib, The Handbook of Brain Theory and Neural Networks, The MIT Press, 2nd ed., 2003.
- Ronald C. Arkin, Behavior-Based Robotics, The MIT Press, 1998.
- George A. Bekey, Autonomous Robots - From Biological Inspiration to Implementation and Control, MIT Press, 2005
- Cynthia L. Breazeal, Designing Sociable Robots, The MIT Press, 2004.
- Brooks, RA, Cambrian Intelligence - The Early History of the New AI, MIT Press, 1999
- Paco Calvo and Antoni Gomila (editors), Handbook of Cognitive Science: An Embodied Approach, Elsevier, Amsterdam, 2008.
- Kenneth A. De Jong, Evolutionary Computation - A Unified Approach, The MIT Press, 2006.

**Further readings:**

will be provided by lecturer