UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Educational Robotics

2223-2-F8501R063

Course title

Educational Robotics

Topics and course structure

Robots are increasingly used as **mediators** in **educational**, **didactic** and **psychological interventions** with children, and as tools to **inquire into cognitive and emotional abilities** in subjects with intellectual disability. The course, drawing from the research activities carried out in the RobotiCSS Lab – Laboratory of Robotics for the Cognitive and Social Science of the Department of Human Science for Education, offers a critical overview of these uses and of their foundations.

More specifically, the course offers
- expert knowledge on some key concepts of robotics and computer science (algorithm, program, robotic architectures, control mechanisms);
- basic skills in robotic programming (educational robots such as LEGO Mindstorms, Cubetto, CoderBot, NAO, Pepper);
- expert knowledge about how robots are currently used in educational, didactic, and psycho-therapeutical contexts.

The course has no prerequisites. Computer science, and robotics are not part of the typical background knowledge of students in pedagogy. For this reason, the students will be guided from scratch to the discovery of robotics and electronics, with a synergy of theoretical reflection and hands-on experimentation.

Objectives

The course promotes acquisition of
- **expert knowledge** on some key concepts of robotics and computer science (algorithm, program, robotic architectures, control mechanisms);
- **basic skills in robotic programming** (educational robots such as LEGO Mindstorms, Cubetto, CoderBot, NAO, Pepper);
- **expert knowledge** about how robots are currently used in educational, didactic, and psycho-therapeutical contexts.

Methodologies

The first part of the course will include dialogical lectures.
The second part will involve simple hands-on programming activities with robots provided by the RobotiCSS Lab – Laboratory of Robotics for the Cognitive and Social Science.

Online and offline teaching materials

Programme and references for attending students

1. Mataric, M.J. (2007), The Robotics Primer, The MIT Press, Cambridge, MA (available online).
2. Chapters 1, 2, 3 and 4 of Harel, D., Feldman, Y., (2004), Algorithmics. The spirit of computing, Addison-Wesley (it. Harel, D., Feldman, Y. 2007, “Algoritmi. Lo spirito dell’informatica”, Springer)
3. Datteri, E., Bozzi, G., Zecca, L. (2020), “**Interazione bambini-robot**”, Casa Editrice Franco Angeli (Milano), which can be freely downloaded (Open Access) at https://www.francoangeli.it/Ricerca/Scheda_Libro.aspx?CodiceLibro=11096.12. **Please focus on the following chapters**:

- Gilda Bozzi, Chiara Merisio, I robot per l'educazione e la didattica. Una rassegna critica della letteratura
- Edoardo Datteri, Federico Cabitza, Gli errori nella programmazione di sistemi robotici
- Stefania Operto, La macchina e il robot. Presupposti cognitivi all'utilizzo della robotica in ambito educativo
- Valentina Conti, Autismo, storytelling e robotica educativa: to be continued
- Chiara Merisio, La "strategia per prova ed errore" non esiste: un'analisi dei laboratori di robotica a EXPLORA, il Museo dei bambini di Roma"
- Luisa Zecca, Gilda Bozzi, Tutoring nella programmazione robotica: prime esplorazioni con Cubetto nella scuola dell'infanzia

Programme and references for non-attending students

Same as for attending students.

Assessment methods

Oral exam. The evaluation criteria will be discussed during the course. Students will also have the opportunity to

prepare a project which may involve the building of a simple electronic/robotic system, using the theoretical and experimental knowledge and skills acquired during the course, or a small empirical research activity.

Office hours

Please contact the lecturer at edoardo.datteri@unimib.it.

Programme validity

Course tutors and assistants

Sustainable Development Goals

QUALITY EDUCATION