EDLRIS
European Driving License
for Robots and Intelligent Systems

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ROBOTICS BASIC

No prior theoretical background is required.
Target group: e.g. interested MINT teachers, secondary school students but also apprentice and re-train people who are already in daily business.
The differences between nowadays beginner courses and this group must be motivated by the mentioned cultural integrations.

The objectives refer to a cultural and creative integration of Robotics concepts. The goal is to enable and motivate people, to foster creativity and curiosity and that people are able to **understand** the technology and **use** robotics systems.

The graduate of the **Robotics Basic** training…

1) Is familiar with the history, the background, the terminology and the fields of application of robotics and its use-cases and knows about the social, ethical and legal implications.

(i.e. historic facts, context, applications/task domains (toys, service, industry, elderly care, …), play with use-cases, autonomous/remote-controlled, HMI aspects, critical reflection on technology, critical thinking, social impact, awareness, …)

- **I know the significance of the Robot in the European culture** (e.g. the Greek mythos: the mechanical handmade of Hephaestus Talos; the story of Pygmalion made by Galatea;.
- **I know that the stories about robots are spread to other cultures giving the idea of an universal desire of an artifact used in the humans service** (the automaton made by Yan Shi in China; the mechanical robots which protect the Buddha's relics in India ; the Egyptian legend of Rocali etc.).
- **I know that during the time this desire was subject of different solution. These solution are at the beginning magical and finally mechanical** (artifact made by gold (Hephaestus) or by mud and animated by magical incantation (the story of golems made by Jewish) , the android made by Albertus Magnus, the mechanical head invented by Roger Bacon, the design of Leonardo da Vinci)
- **I know the origin of the word Robot** (Rossum's Universal Robot play write by Karel Capek. The term automata switch robot)
- **I know that the Robots rise ethical problems** (the play of Karel Capek and the three laws of Robotics proposed by Isaac Asimov)
- **I know that the Robots is subject of technological development** (the android is replaced by an arm the Unimate invented by George Devol)
- **I know that the robotics – the science of robot design – develop new product which are more and more present in our daily live** (the toys, the domo products etc.)

2) Understands the big picture of robot system i.e. the context and the ecosystem where the robot is integrated.

- **I know that nowadays the Robot is a tool**(this tool is programed and act in a deterministic way)
- **I know that the behaviors of the Robots are subject of different limitations** (nowadays the robots are not intelligent artefacts the behavior is not emergent e.g. it is impossible to ask a vacuum cleaning Robot to play go)

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3) Understands the potential of robotics and is creative in imagining new scenarios of robotics - human user interaction.

- **I imagine different task and I imagine the Robots which can solve these tasks** (e.g. a universal cleaning robot; a play partner robot etc.)
- **I can imagine new scenarios where Robots acts like intelligent agents** (the robot can interact with a person using a complex HMI; the robot is humanoid etc.)

4) Knows and understands the fundamental robotics concepts.
(i.e. sense, plan, act; understanding that a robotics system is more than just a single robot)

- **I know that the robot is a cybernetic system** (I am familiar with the system concept and with the feedback concept);
- **I can use other cybernetic systems like models and imagine different solutions (robots) for different application subsystem** (e.g. for a cleaning robot I can imagine solutions sense, plan, act.)

5) Knows the components required to implement the fundamental robotics concepts.
(i.e. motors, sensors, controllers, …)

- **I know the subsystems which compose the Robots** (I am familiar with the following subsystems: the comparator, the controller, the plant, the sensor)
- **I know the causal interaction between these components** (the output from the comparator is the error which is the input to the controller etc.)
- **I understand the block diagram of the Robot and I use the object oriented paradigm for imagining different solutions for each block** (e.g. a motor can be a DC motor or a step by step motor etc.)

6) Is able to integrate components in a robotics system for a simple task.
(i.e. doing a final project, e.g. building a robot for various tasks; therefore, having basic programming skills, applying teamwork, fostering social interaction)

- **I am able to understand and use robots toolkits**

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