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Model Curriculum for a European Master in Robotics

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While the information extracted from the Robotics Curricula Data Base reveals that it is clear that there is certain agreement with the main subjects treated in robotics courses all around Europe, when dealing with Masters the curricula is much more dispersed.

The following 36 institutions (ordered by countries) have introduced master courses in the RCDB:

Country	Institution
Belgium	Katholieke Universiteit Leuven
Denmark	Technical university of Denmark
Finland	Helsinki University of Technology
France	Ecole Centrale de Nantes
France	Ecole Nationale de Techniques Avancées (ENSTA)
France	ENSPS, University Louis Pasteur
France	ESIEA
France	Inst. Nat. Polytechnique de Grenoble (INPG) & Univ. Joseph Fourier (UJF)
France	Institut National des Sciences Appliquées de Lyon
France	Institut Universitaire de Genie Electrique et Informatique Industrielle
France	IUP SYSTEMES INTELLIGENTS - UNIVERSITE PAUL SABATIER
France	Nice Sophia Antipolis University
France	Paul Sabatier University
France	Université Joseph Fourier, UFR de MECANIQUE
France	Université Pierre et Marie Curie / ENSAM- Paris / ENS-Cachan
France	University of Strasbourg I
France	UTC - Universite de Technologie de Compiègne
Germany	Institute of Computer Science and Engineering (CSE)
Israel	Tel-Aviv University, School of Mechanical Engineering
Italy	DEIS, Dip. di Elettronica Informatica Sistemistica, Univ. di Bologna
Italy	DIMEC - University of Genova
Italy	Politecnico di Milano
Italy	Politecnico di Torino
Italy	Scuola Superiore Sant'Anna
Italy	Università degli Studi di Milano - Bicocca
Italy	Università degli Studi di Napoli Federico II
Italy	Università di Pisa
Netherlands	Delft University of Technology
Netherlands	Universiteit van Amsterdam
Portugal	Instituto Superior Técnico, Lisbon Technical University
Portugal	University of Minho
Slovenia	Faculty of Electrical Engineering, University of Ljubljana
Spain	Universitat Politecnica de Catalunya
Sweden	Orebro University
Sweden	Royal Institute of Technology
United Kingdom	University of Plymouth

All they include some courses on Robotics but probably not all of them can be considered as reference courses for a Master on Robotics. Through a visit to their webs it can be observed the high diversity of contents and objectives in their programs. As an example of these differences you can visit the Master on Medical Robotics in Pisa University (Italy) or the Master in Robotics and Intelligent Systems in Örebro University (Sweden). While the first is obviously focused on Medical applications, including some subjects from Biology or Medicine Areas, the second is oriented to Mobile Robotics and Intelligent and Autonomous Systems.

For a deeper analysis on the present situation and aiming, initially, to prepare a model of Master Curricula, a group has been constituted, trying to represent the wide variety of countries in Europe. Based on the experience in designing courses and masters, as well as the teaching background of the people involved some recommendations or orientations are expected. The idea of producing a Model of Master should be carefully considered, as result of the previous concerns derived from the real situation in each country and each university. Being a model, recommendations or other output, the working group will determine how to assist the robotics community in robotics educational matters.

From the meeting of the steering group last March, and the meeting with the Euron members during a session in the annual meeting, some problems and comments raised:

- Being Master courses at higher level than Graduate courses, there is a higher specialization, and consequently a wider dispersion in contents, what makes it difficult to try to fix a model. On the other side, diversity can be considered worth value and probably should be preserved.
- Organizational issues: Different number of credits in each country makes sharing curricula complex, the question of who gives the title is a big concern, etc.
- Mobility: Studying in several schools and countries is enriching, but is highly costly. Funds are needed.
- Euron stamp/title/recognition: Does it have some sense? It could encourage the improvement of quality, but needs a permanent structure to evaluate the quality of the masters and the accomplishment of Euron levels of quality and main goals, as well as defining some accepted evaluation criteria.

Doubting that a real model of Master is possible or even convenient, as variety is richness, some main indications on general aspects, basic contents, and other transversals recommendations can be established, let's say: Teaching methods, minimum percentage of practical work, students working load, ethical issues, sustainability, gender issues, etc.

These matters are planned to be solved, working from the Curricula data Base information, and assessed by the Curricula team with the goal of generating a document with a model, if possible, or at least, some conclusions. A first two days meeting is planned within this semester.