

LABORATORY ON CHIP

1.1. Identification

University:	Alma Mater Studiorum – Università di Bologna											
School:	School of Engineering											
Course:	Laboratory on chip											
ECTS:	6											
Semester:	<i>Winter</i>			X	<i>Summer</i>							
Category	<i>Fundamental course</i>					<i>Specialisation course</i>				X		
Module	<i>MFI</i>		<i>MFII</i>		<i>MFIII</i>		<i>MSI</i>		<i>MSII</i>		<i>MSIII</i>	X
Teachers:	Roberto Guerrieri											
Language:	<i>English</i>	X	<i>Italian</i>	X	<i>Swedish</i>		<i>Spanish</i>					

1.2. Learning-outcomes

- Knowledge about the fundamentals of design of laboratory on chip and micro integrated analysis systems

1.3. Competencies

▪ General

- To have critical understanding of technical and scientific tools.
- Communication skills.
- To be able to work in an international context

▪ Specific

- To design electronic and fluidic structures for the manipulation of biological objects
- To test these structures in a joint electronic/biotechnology laboratory

1.4. Contents

1. Motivations of lab-on-a-chip technology.
2. Elements of micro fluidics.
3. Electric effects in fluids.
4. Manipulation of micro particles by electric fields.
5. Sensing of active molecules and micro particles in lab-on-a-chip.
6. Manufacturing technologies for lab-on-a-chip

1.5. Teaching Methodology

- Lecture sessions.
- Laboratory sessions using CAD tools.
- Laboratory sessions using equipment

1.6. Evaluation

- Oral exams
- Course projects

1.7. Bibliography

- H. Morgan, N. Green, *AC Electrokinetics: colloids and nanoparticles*, Baldock, 2003
- H. Bruus, *Theoretical microfluidics*, Denmark, 2004