



Programme of Course "ANALYSIS AND CONTROL OF HYBRID SYSTEMS"

- Code: I2I017
- Type of course unit: Elective (Laurea Magistrale in Ingegneria Informatica e Automatica curriculum Generale)
- Level of course unit: Postgraduate Degrees
- Semester: 2

Number of ects credits: (Laurea Magistrale in Ingegneria Informatica e Automatica) 6 (workload 150 hours)

Teachers: Maria Domenica Di Benedetto

<b>1</b>	<b>Course objectives</b>	The objective of the course on hybrid systems is presenting the foundations of hybrid models (discrete event systems that interact with physical systems described by continuous dynamics) and their use for the design of control systems, in particular for embedded distributed systems.
<b>2</b>	<b>Course content and learning outcomes (dublin descriptors)</b>	<p>Topics of the module include:</p> <ul style="list-style-type: none"> <li>• Modeling: safety properties, deadlocks, switching systems.</li> <li>• Reachability and controlled invariance.</li> <li>• Observability and hybrid observers.</li> <li>• Control with safety constraints, approximations of maximal safe sets.</li> <li>• Stability and stabilization of switching systems.</li> <li>• Applications: Hybrid models and controllers for automotive and traffic control. Air traffic management using hybrid observers. Control over wireless networks, with application to energy efficient buildings and smart grids</li> </ul>
<b>3</b>	<b>Course prerequisites</b>	Foundations of Systems Theory and Automatic Control
<b>4</b>	<b>Teaching methods and language</b>	Lectures and recitations <b>Language:</b> English
<b>5</b>	<b>Assessment methods</b>	Oral exam and project