

<b>Thesis Topic</b>	<b>Digitalization</b>
<b>Degree level</b>	Engineering/Bachelor/Master
<b>Description</b>	<p>This project will contribute to the digitalization of industry towards the Industry 4.0 and to smart manufacturing [2].</p> <p>You will work in some of the parts that are necessary to achieve the level of automation expected during the 4<sup>th</sup> industrial revolution [2]. Software will monitor, control, and autonomously manage industrial processes and machinery.</p> <p>To achieve that, it becomes necessary to have</p> <ul style="list-style-type: none"> <li>- accurate digital representations of the real/physical elements in the industry,</li> <li>- feed them with real data,</li> <li>- analyze/simulate their behavior,</li> <li>- create the software that ---using the results from the simulation--- can take autonomous decisions on the optimal work that the real elements should do in each moment,</li> <li>- and transmit the instructions back to the real elements[1].</li> </ul> <p>Useful links:  [1] <a href="https://en.wikipedia.org/wiki/Digital_twin">https://en.wikipedia.org/wiki/Digital_twin</a>  [2] <a href="https://en.wikipedia.org/wiki/Fourth_Industrial_Revolution">https://en.wikipedia.org/wiki/Fourth_Industrial_Revolution</a></p>
<b>Objectives</b>	<p>Your project will address some of these objectives:</p> <ul style="list-style-type: none"> <li>• Developing digital models that represent accurately the real elements; that is, a digital replica of the real elements</li> <li>• Developing the behavior of the digital replicas to perform as the real elements.</li> <li>• Developing the connection between sensors and monitors of the real elements with the digital replica in order to feed the digital/virtual replica with real data</li> <li>• Developing a method to transform Model-to-Model or Model-to-code.</li> <li>• Developing methods to predict characteristics of the real element using the models and behavior in the digital replica</li> </ul>
<b>Requirements</b>	<p>Requirements:</p> <ul style="list-style-type: none"> <li>- For Thesis at Bachelor level: Software testing, Software Design, Programming</li> <li>- For thesis at Master level: previous requirements and, Modelling and simulation, Model-Driven Engineering</li> </ul>
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