



Code	INI-307	Prerequisites	INI-348, ING-302
Name	Production Systems Design I	Co-requisites	None

Credits	Contact Hours
04	44
Categorization of credits	
Math and basic science	
Engineering topic	X
Other	

Coordinator's name	Cayetano Rodríguez
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Text book
Heizer, J. And Render, B. (2014). Operations Management Principles - Fifth Edition. Mexico: Pearson Education Nobel, B.W. and Freivalds, A. (2014). Industrial Engineering of Nobel, 13th edition, Mexico City: McGraw Hill
Other supplemental materials
Hernandez, J.C. and Vizán, A. (2013). Lean Manufacturing Concepts, Techniques and Implementation. Madrid: EOI Foundation Lunau, S. (2009). Design for Six Sigma + Lean Toolset Frankfurt, Germany: Springer Project Management Institute (2013). Project Management Fundamentals Guide - Fifth Edition. Newtown Square, PA: PMI Rother, M. and Harris, R. (2001). Creating Continuous Flow. Brookline, MA: The Lean Enterprise Institute Taghizadegan, S (2006). Essential of Lean Six Sigma. Oxford, UK: Elsevier Womack, J.P. and Jones, D.T. (2003). Lean Thinking - Revised and Updated. New York, NY: Free Press Carreira, B (2005). Lean Manufacturing that works. New York, NY: AMACOM Nash, M.A. and Poling, S.R. (2008). Mapping the Total Value Stream. New York, NY: CRC Press

Description
Production Systems Design I is a theoretical-practical subject where students will learn to analyze and develop basic production systems, both for industrial and service companies, or to improve existing ones. For both cases, the student must use methods of design and problem solving that include phases or steps that range from identifying the needs of the client (person or company that requires the solution of a problem) to the creation, selection and argumentation of the proposed solution(s). It should be added that, within each of the phases of these methods mentioned above, there are tools

designed to: identify customer needs, define problems, analyze their causes, design, present and plan the implementation of solutions, among other types of tools. The student will then learn to identify and apply the appropriate tool for each type of problem that is presented and in the corresponding sequence.

Type of course	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
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Specific goals for the course	
Outcomes of instruction	<ol style="list-style-type: none"> 1. Identifies customer needs to transform them into objectives, criteria and constraints with a high level of compatibility and making use of tools, methods and / or engineering systems. 2. It generates sufficient alternatives with a high level of correlation with established criteria and restrictions, in accordance with engineering sciences and taking into account health, welfare and safety. 3. Select the best alternative by effectively applying decision-making methodologies and based on established design constraints. 4. It defines the problem in a systemic way, including all internal and external aspects of the problem, such as impact on other areas, stakeholders in problem resolution, support roles needed, etc. 5. It determines all causes of the problem from the use of specific techniques and prioritizing among the causes found. 6. Select the best solution using complex methods (as needed), according to the problem definition and within previously identified alternatives. 7. Justifies the selected alternative based on arguments consistent with the criteria set in the problem definition.
Student outcomes	<p>SO1. Identifies, formulates and solves complex Engineering problems through the application of Engineering, Science and Mathematics principles.</p> <p>SO2. Apply and use the engineering design process to produce solutions that meet specific needs, taking into consideration public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.</p>

Topics
<p>Unit I: Overview of Production System Design</p> <p>Unit II: Methods and Tools for identifying customer needs and defining the problem</p> <p>Unit III: Methods and Tools to analyze production systems and propose design alternatives</p> <p>Unit IV: Methods and Tools for planning and sustainability of production systems</p>