



Code	INI393	Prerequisites	INI-391 INI-391L
Name	Operational Research II	Co-requisites	INI-393L

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

Coordinator's name	Heidi Romero
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Text book
Kelton, W.D., Sadowski, R.P., Swets, N.B. (2014) Simulation with Arena. McGraw-Hill Education. Rossetti, M.D. (2015) Simulation Modeling and Arena. Willey Publishers. Shortel, J.F., Thompson, J.M., Gross, D., Harris, C.M. (2018) Fundamentals of Queueing theory. Willey Publishers. Taha, H.A. (2016) Operations Research. Pearson Prentice Hall.
Other supplemental materials
Altioik, T., Melamed, B. (2010) Simulation Modeling and Analysis with ARENA. Elsevier. Diaz Redondo, R.P., Pazos Arias, J.J., Fernández Vilas, A. (2010) Problems of Tail Theory. Andavira Editor.

Description	
At present, one of the major challenges of the industry is the need to optimize the use of resources used for the production of goods or services. This subject emphasizes the analysis and design of stochastic models to evaluate performance and propose alternatives for improvements in manufacturing processes and services, using engineering criteria to draw conclusions. The course content covers the basic concepts of system simulation, process modeling, verification and validation of results through the use of statistical tests. Finally, it includes the classification of the models of queue theories using the Kendall nomenclature, describing their characteristics and their application in solving practical problems.	
Type of course	Required ☒ Elective ☐

Specific goals for the course	
Outcomes of instruction	1. Identifies and applies optimization methods to solve engineering problems using stochastic variables. 2. Formula and model problems using stochastic variables.

	3. It evaluates data from a mathematical model in order to propose alternatives for improvements in a complex engineering problem. 4. Design systems, components or processes by modeling and simulating discrete events. 5. It reflects on their learning experiences, identifying strengths and points of improvement to achieve continuous learning. 6. Interprets and evaluates the results of a simulation model through the use of statistical tests.
Student outcomes	SO1. Identifies, formulates and solves complex Engineering problems by applying the principles of Engineering, Science and Mathematics. SO6. Develops and conducts appropriate experimentation, in which they analyze and interpret data, as well as use engineering criteria to draw conclusions. SO7. Acquire and apply new knowledge using appropriate learning strategies.

Topics
Unit I. Introduction to System Simulation Unit II. Simulation Models Unit III. Queue Theory