Code	INI310	Prerequisites	INI388
Name	Quality Control	Co-requisites	None

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

Coordinator's name	Prof. Jessica Pamela Feliz Garrido.ME.

Text book
Barrentine, L. (2012). Concepts for R&R Studies (2nd ed.). American Society for Quality. Evan, J., & Lindsay, W. (2008). Administration and quality control (7th ed). Cengage Learning Gallardo Vázquez, S. (2015). Elements of telecommunications systems. Paraninfo Editions. ISBN:8428336636, 9788428336635 Gutiérrez Pulido, H., & De la Vara, R. (2013). Statistical quality control and Six Sigma (3rd ed.). McGraw Hill.
Other supplemental materials
Chrysler Handbook (1989). Using SPC to be the Best. Chrysler Group LLC. Montgomery, D.C. (2001). Introduction to statistical quality control (4th ed.). John Wiley and Sons. Phadke, M.S. (1989). Quality Engineering using robust design. Prentice Hall

Description	
The subject is oriented to the design of systems for quality control and assurance and implementation of statistical process control. It includes analysis of a process's capacity and techniques for process improvement, as well as the implementation of Lean Six Sigma as a project methodology.	
Type of course	Required ☒ Elective ☐

Specific goals for the course	
Outcomes of instruction	1. Defines the problem by identifying all the key internal aspects of the problem: objectives, metrics, flow of the process containing the problem, inputs and outputs of each stage of the

	process, among others, using the necessary methodologies to define it. 2. Determines all causes of the problem, using some more complex techniques to find these causes or to validate them 3. Proposes several solutions to the problem, selecting the best alternative through the use of various methods based on the principles of engineering, science and/or mathematics. 4. Elaborates sufficient arguments to justify the selected solution, using evaluation techniques, showing a strong correlation between the arguments and the criteria established in the definition of the problem and grouping all the necessary data used to justify the selected solution. 5. Identifies needs, transforming them into objectives, criteria and constraints with a high level of compatibility, making use of tools, methods and / or engineering systems. 6. Generates sufficient alternatives with a high level of correlation with established criteria and restrictions and in conformity with engineering sciences. 7. Selects the best alternative by effectively applying decision-making methodologies and based on established design constraints. 8. Participates in the planning of the objectives and their follow-up until the fulfillment in an efficient way. 9. Interacts with team members in an appropriate manner, encouraging and considering the ideas of other members and implementing strategies to avoid and resolve conflicts. 10. Assumes the corresponding roles within the team according to their abilities, fulfilling the commitments and respecting the established deadlines. 11. Sets the objectives of the experiment, distinguishing the key aspects, selecting the critical factors, as well as all relevant responses, through a minimum amount of feasible tests. 12. Conducts the experiment in a comprehensive manner: interpreting the behavior of variables throughout runs, ensuring that instruments and measurement methods are able to detect variations in the process, involving stakeholders, maintaining leadership and coordinating all activities of the experiment. 13. Interprets the data and events that occurred during the experimentation from the intensive use of multiple analysis tools, organizing and documenting them without affecting the process, and also performing confirmation runs when necessary to determine if the data obtained are consistent with the experimental assumptions. 14. Argues about the results obtained based on the evidence and the analysis of experimentation, explaining the differences between the data obtained and the experimental assumptions, recommending the application of the results and identifying possible risks.

Student outcomes	SO1. Identifies, formulates and solves complex engineering problems by applying the principles of Engineering, Science and Mathematics. 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. SO5. Function effectively in a team whose members together provide leadership, create a collaborative and inclusive environment, set goals, plan tasks, and meet objectives. SO6. Develops and conducts appropriate experimentation, in which they analyze and interpret data, as well as use engineering criteria to draw conclusions.

Topics
Unit I. Introduction to Quality Control
Unit II. Planning. DMAIC Stage Defines
Unit III. Statistical Process Measurement and Control. DMAIC Stage Measure.
Unit IV. Other Quality Control Tools
Unit V. Case Analysis and Validation DMAIC Stage Analyze
Unit VI. Continuous Improvement Methodologies DMAIC Stage Improve
Unit VII. Continuous learning and sustainability. DMAIC Stage Control