Code	ING-210	Prerequisites	AHQ-101 CBM-206
Name	Research in Engineering	Co-requisites	None

Credits	Contact Hours
03	33
Categorization of credits	
Math and basic science	
Engineering topic	X
Other	

Coordinator's name	Derby Lionel González Sajium

Text book
Other supplemental materials
Cea D'Acona, M.A. (1997). Methods and techniques of quantitative research. Madrid: Editorial Sínthesis. Festinger, L., Katz, D. (1992). Research methods in Social Sciences. Country. Flórez Ochoa, R., Tobón Restrepo, A. (2001) Educational and pedagogical research. Bogota: Mcgraw-Hill. Grawitz, M. (1984) Methods and techniques of Social Sciences I-II. Mexico: Editorial Mexicana. Hernández Sampieri, R., Fernández Collado, C., Baptista Lucio, P. (2014) Methodology of research. (6th Edition). Mexico: McGraw-Hill Education. Jauset, J. (2000) Audience research on television: statistical foundations. Spain: Paidós. Legrá Lobaina, A. A. (2017) Theoretical and practical elements of scientific and technological research. (1st Edition). Cuba: Ed. Félix Varela Padua, J. (1982) Research Techniques. Mexico: FCE-Colegio de México. Sabino, C. A. (1996) The Investigative Process. Buenos Aires: Edit. Lumen. Salkind, N. J. (1999) Research methods. Mexico: Prentice Hall. Sierra Bravo, R. (1995) Social research techniques: theory and exercises. (10th edition). Madrid: Paraninfo. Taylor, S. J., Bogdan, R. (1987) Introduction to qualitative research methods: Barcelona: Paidós. Visauta, B. (1998) Statistical analysis with SPSS for Windows (vol. I - II). McGraw-Hill.

Description

This subject is oriented to the learning of the different epistemic models, understood as conceptual representations on which thinking and scientific methodology are developed, but with an orientation to the natural sciences of engineering. Likewise, it promotes awareness about the importance of the relationship between research and technological innovation and competitiveness, which in turn are means to generate solutions to various problems in society. The subject emphasizes the use of principles, approaches, methods and tools necessary for research, as well as the development of teamwork, the comprehensive approach to the study of real phenomena, and interdisciplinarity in the knowledge and treatment of different problems. These contents are organized into ten teaching units.

Type of course	Required ☒ Elective ☐

Specific goals for the course	
Outcomes of instruction	EG1. It shows objectivity and ethics in the presentation of the results of research projects. EG2. Recognizes the importance of the analysis, synthesis and updating of knowledge in conducting research. EG3. Produces technical reports according to the requirements of scientific writing, demonstrating reasoning and appropriate use of structure and language.
Student outcomes	CG1. Recognizes ethical and professional responsibilities in engineering situations and makes informed judgments considering the impact of engineering solutions in global, economic, environmental and social contexts. CG2. Identifies, formulates, and solves complex engineering problems by applying the principles of engineering, science, and mathematics.

Topics
Unit I. Definitions of quantitative and qualitative approaches, their similarities and differences Unit II. Origin of a quantitative, qualitative or mixed research project: the idea Unit III. Quantitative approach to the problem Unit IV. Development of theoretical perspective: literature review and construction of theoretical framework Unit V. Definition of the scope of the investigation being conducted Unit VI. Formulation of assumptions Unit VII. Conception or choice of research design Unit VIII. Selection of the sample Unit IX. Quantitative data collection Unit X. Data analysis and results report