



### STUDENT OUTCOMES

#### INDUSTRIAL ENGINEERING PROGRAM

##### (1) Engineering Design

Definition	Design systems and processes to obtain goods and services satisfying requirements and needs as well as given technical, economic, social and legal constraints and limitations.
Criteria	Interpret requirements and needs and translate them into the formulation of an industrial engineering project.
	Formulate and analyze the specifications of a design project considering technical variables, as well as realistic economical, social, legal and environmental restrictions.
	Propose and evaluate solution alternatives to select the most adequate satisfying requirements and constraints.
	Present and describe the solution through specifications, planes, engineering drawings, diagrams and virtual simulations.
	Propose the process to implement the solution.

##### (2) Problem Solving

Definition	Identify, formulate and solve engineering problems properly using the methods, techniques and tools of industrial engineering.
Criteria	Identify and diagnose problems and prioritize them according to their impact and relevance.
	Propose adequate and realizable solutions using appropriate norms and standards.
	Use techniques and methodologies of industrial engineering to describe, analyze and solve engineering problems.
	Operate and use equipment, instruments and software required for industrial engineering practice.
	Model and simulate systems and processes to evaluate, optimize and predict their behavior and results.



### (3) Sciences Application

Definition	Apply the knowledge and skills of mathematics, sciences and engineering to solve industrial engineering problems.
Criteria	Identify the relevant variables of a system, define their metrics and formulates dependence relationships.
	Apply mathematical models for analyzing, simulating and predicting the behavior of production and management processes and systems.
	Interpret physical phenomena and chemical processes from the from the fundamental laws that govern them. .
	Apply knowledge of sciences and engineering for solving real-world engineering problems.

### (4) Experimentation

Definition	Conceive and conduct experiments and tests, analyze data and interpret results.
Criteria	Determine objectives and restrictions of the experiment or test to be performed.
	Determine the required equipment, tools and materials according to the experiment to be done.
	Discriminate the relevant variables of an experiment, relating, measuring and quantifying them, and determining their tolerances.
	Analyze and process data and results using proper concepts and criteria.
	Use the scientific method for developing experiments, design and research projects.

### (5) Modern Engineering Practice

Definition	Use and apply techniques, methods and tools of modern engineering necessary for the practice of industrial engineering.
Criteria	Use equipment, instruments and software typical of professional practice.
	Apply modern techniques and methods for the analysis, design and implementation of industrial and management systems and processes.
	Use modern technologies and tools for automating industrial and management processes.



### (6) Engineering Impact

Definition	Understand the impact of industrial engineering solutions on people and society in local and global contexts.
Criteria	Recognize the role of industrial engineering on the progress of society and the wellbeing of people.
	Identify and appraise the economical and social benefits of industrial engineering works.
	Recognize the importance of industrial engineering for the creation and innovation of products and processes.
	Understand the impact of industrial engineering solutions in labor and social environments.

### (7) Project Management

Definition	Plan and manage industrial engineering projects taking into account quality, efficiency, productivity and profitability criteria.
Criteria	Formulate the objectives and restrictions of an industrial engineering project and propose strategies for implementation.
	Apply proper costing systems and computes the project profitability.
	Determine the scope of a project, its activities and priorities, and propose execution and control schedules.
	Identify and plan the use of materials, human, technological and economic resources for implementing the project.
	Determine the technical and economical feasibility of an engineering project as well as its social and environmental viability.
	Formulates indicators and ratios for monitoring the proper implementation of the processes involved, considering aspects of quality, productivity, effectiveness and safety.



### (8) Environmental Appraisal

Definition	Takes into account the importance of preserving and improving the environment in the development of their personal and professional activities.
Criteria	Promote the use of materials, technologies and processes that are environmentally adequate.
	Make a rational use of natural resources understanding their importance in the life of people and society.
	Participates in activities and campaigns for environment and ecosystems conservation and improvement.
	Promote the sustainable development in their professional activities and apply norms of environmental management.

### (9) Lifelong Learning

Definition	Recognize the need to keep their knowledge and skills up to date according to advances of industrial engineering and engage in lifelong learning.
Criteria	Identify relevant areas for the development of their professional career.
	Keep themselves up to date on new tendencies and technologies of industrial engineering as well as their diverse applications.
	Be autonomous in their learning process.
	Be part of research groups and students branches of professional associations.
	Attend and participate in events of professional development.

### (10) Contemporary Issues

Definition	Know and analyze relevant contemporary issues in local, national and global contexts.
Criteria	Be informed and emit opinion about the main social, economical and political facts in local and global contexts.
	Understand relevant social and economical issues affecting his/her professional career and working environment.



### (11) Ethical and Professional Responsibility

Definition	Evaluate their decisions and actions from a moral perspective and assume responsibility for the executed projects.
Criteria	Anticipate the implications of their decisions as well as the results of their actions and projects
	Appraise the punctual and responsible fulfilling of their personal and professional duties.
	Takes into consideration community interests and the social benefit.
	Knows and act according to the professional code of ethics.

### (12) Communication

Definition	Communicate clearly and effectively in oral, written and graphical formats, interacting with different types of audiences.
Criteria	Express their ideas clearly and concisely using the adequate technological support.
	Elaborate clear and precise technical documentation using norms, symbology and terminology proper of industrial engineering.
	Adjust their speech according to the type of audience for getting a proper understanding and interpretation.
	Read technical documentation in English.

### (13) Teamworking

Definition	Appraise the importance of teamworking and participate actively and effectively in multidisciplinary teams.
Criteria	Can perform as leader or active member of a working team effectively participating to achieve the proposed goals and results.
	Propose and accepts ideas conducting to the achievement of objectives and results.
	Appraise the differences of opinion, is tolerant and respect agreements.