NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF SCIENCE
PHYSICS PROGRAM

STUDENT OUTCOMES

(1) Problem Solving

Definition	Identify, formulate and solve scientific and technical problems properly applying the knowledge of mathematics and science, and technical topics relevant to basic and applied Physics.
Criteria	Identify and diagnose problems and prioritize them according to their impact and relevance.
	Propose and compare practical and realizable solutions.
	Evaluates and select the proper solution with sustainability and economic rationality criteria.
	Correctly apply the concepts and methods of mathematics and sciences for the formulation, description and solution of problems.
	Operate and use equipment, instruments and software required for Physics practice.
	Take into account safety measures in the practice of Physics.

(2) Design

Definition	Formulate and design a system, process, procedure, program or component satisfying requirements and needs, as well as given technical, economic, social and legal constraints.
Criteria	Interpret requirements and needs and translate them into the formulation of a physics design project.
	Formulate and analyze the specifications of a design project considering technical variables, as well as realistic economic, social, and environmental restrictions.
	Propose and evaluate solution alternatives to select the most adequate satisfying requirements and constraints.
	Make use of applicable methods, techniques, norms and standards.
	Present and describe the solution through specifications, maps, graphs, drawings, diagrams and virtual simulations.

(3) Experimentation and Testing

Definition	Conceive and conduct experiments, validate hypothesis, analyze data and interpret results, and apply scientific judgment to draw conclusions.
Criteria	Determine the objectives and restrictions of the experiment to be performed.
	Determine the required equipment, tools and software applications 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, statistical methods and criteria.
	Draw coherent and logical conclusions with scientific criteria.
	Apply the scientific method for developing experiments, and research projects.

(4) 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 the application field.
	Adjust their speech according to the type of audience for getting a proper understanding and interpretation.
	Read technical documentation in English.

(5.a) Ethics and 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 fulfillment of their personal and professional duties.
	Take into consideration community interests and the social benefit.
	Respect intellectual property and recognizes the authorship of other people works and projects.
	Act according to the professional code of ethics.

(5.b) Science Impact

Definition	Understand the impact of technical and/or scientific solutions on people, society and environment in local and global contexts.
Criteria	Recognize the role of Physics on the progress of society and the wellbeing of people.
	Identify and appraise the economic and social benefits of Physics works and methods.
	Recognize the importance of Physics for the creation and innovation of products and processes.
	Understand the role of Physics in risk prevention and disaster mitigation.

(6.a) 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.

(6.b) Project Fulfillment

Definition	Plan and complete technical and/or scientific projects, fulfilling objectives, restrictions and deadlines, considering risks and uncertain conditions.
Criteria	Formulate the objectives and restrictions of a project, and plan and propose strategies for implementation.
	Identify the required resources to complete a project and ensure their availability.
	Determine the scope of a project, its activities and priorities, and propose execution plans to meet deadlines.
	Identify the risks and uncertainties affecting a project, and propose actions to avoid or mitigate their effects on the project development.

(7) Environmental Awareness

Definition	Take 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 the conservation and improvement of environment and ecosystems.
	Promote the sustainable development in their professional activities, and apply norms of environmental management.