GLO A – Nature of Science and Technology

Differentiate between science and technology, recognizing their respective strengths and limitations in furthering our understanding of the material world, and appreciate the relationship between culture and the development of technologies.

SLO A1:

Identify and appreciate the manner in which history, circumstance, and culture shape the science of a society and its creation or use of technologies.

SLO A2:

Identify and describe how research programs in science are publicly supported, funded, and influenced by the pressures of priority, merit, and foreseeable effects in the larger society.

SLO A3:

Examine and analyse an instance, either historical or present-day, where 'revolutionary' scientific change altered the fundamentals of a discipline, a research programme, or the behaviour within a scientific community.

SLO A4:

Analyse a controversial issue in the context of science as a community endeavour. Include: activities within the scientific community and potential influences beyond the scientific community

SLO A5:

Identify and model the characteristics of peer review in the development of scientific knowledge.

GLO B – Science, Technology, Society and the Environment

Explore problems and issues that demonstrate interdependence among science, technology, society and the environment within the context of sustainability

SLO B1:

Identify and explore a current STSE issue.
Examples: clarify what the issue is, identify different viewpoints and/or stakeholders, research existing data/information…

SLO B2:

Recognize that decisions reflect values and consider their own values and those of others when making a decision.
Examples: maintaining/preserving the environment, generating wealth, maintaining personal and economic freedoms, maintaining health and wellbeing…

SLO B3:

Evaluate implications of possible alternatives or positions related to an STSE issue.
Examples: positive and negative consequences of a decision, strengths and weaknesses of a position…

SLO B4:

Recommend an alternative or identify a position and provide justification.

SLO B5:

Propose a course of action related to an STSE issue.

SLO B6:

Reflect on the process used by themselves or others to arrive at an STSE decision.

GLO C – Scientific and Technological Skills and Attitudes

Demonstrate appropriate inquiry, problem-solving, and decision-making skills and attitudes, for exploring scientific and/or technological issues and problems.

Inquiry

SLO C1:

Identify questions to investigate that arise from practical problems and issues

SLO C2:
Clarify problems and refine testable questions to facilitate investigation.
Examples: develop a testable question appropriate to circumstances; define and delimit the kind and number of inquiry pathways.

SLO C3:

Design and conduct an investigation to answer a specific scientific question.
Examples: materials necessary, independent/dependent variables, controls, testable hypothesis or prediction, methodology, safety considerations, appropriate sampling procedures….

SLO C4:

Demonstrate work habits that ensure personal safety, the safety of others, and the consideration of the environment.
Examples: application of WHMIS, proper disposal of chemical or biological specimens….

SLO C5:

Select and use scientific equipment appropriately and safely.
Examples: volumetric glassware, microscopes, balances, test kits, probeware…

SLO C6:

Estimate and measure accurately using Systeme International (SI) and other required standard units.
Include SI conversions, interconversion of units, significant figures

SLO C7:

Evaluate the relevance, reliability and adequacy of data and the methods used to collect data.
Include: discrepancies in data, sources of systemic error, precision versus accuracy

SLO C8:

Interpret patterns and trends in data, and infer and explain relationships.
Examples: line of best fit, regression equations, statistical analysis, modes of representation (visual, numerical, graphical, symbolical

SLO C9:

Analyse data or observations in order to draw conclusions consistent with the available results of an investigation and identifies the implications of these results.
Examples: cause and effect relationships, alternative explanations, support for or rejections of an hypothesis or prediction statement.

SLO C10:

Identify new questions or problems that arise from an investigation

Research / Information Management

SLO C11:

Synthesize information obtained from a variety of sources.

SLO C12:

Evaluate information obtained to determine its usefulness for one's needs.
Examples: scientific accuracy, reliability, currency, relevance, balance of perspectives, bias…

SLO C13:

Quote from or cite sources as required and reference sources according to an accepted practice.

SLO C14:

Communicate information in a variety of forms appropriate to the purpose, audience and context.
Include: technical science writing (*e.g., proposals, laboratory reports, research reports…*); popular science writing (*e.g., magazine articles, comics, short stories, poetry…*)

SLO C15:

Use bibliographic and electronic research tools to collect information on a selected topic.
Examples: keyword searches, search engine navigation, databases…

SLO C16:

Compare diverse perspectives and interpretations in the media and other public information sources.
Examples: how various media treat scientific information and/or issues…

SLO C17:

Select and use appropriate media to communicate information/data/ideas.
Examples: software, video, photography, visual arts…

Collaboration

SLO C18:

Collaborate with others to achieve group goals and responsibilities.

SLO C19:

Ellicit, clarify and respond to questions, ideas, and diverse points of view in discussions.

SLO C20:

Evaluate individual and group processes used in planning, problem-solving and decision-making or task completion.

Attitudes and Scientific Habits of Mind

SLO C21:

Demonstrate confidence in their ability to carry out investigations and to address STSE-related issues.

SLO C22:

Value skepticism, honesty, accuracy, precision, perseverance, and open-mindedness as scientific and technological habits of mind.

SLO C23:

Demonstrate a continuing, more informed interest in science and science related careers and issues.

SLO C24:

Be sensitive and responsible in maintaining a balance between the needs of humans and a sustainable environment.

General Learning Outcome D – Essential Science Concepts

Explore, understand, and use scientific knowledge in a variety of contexts.

SLO D1:

Integrate knowledge, as necessary, from various science specialties in order to address an issue, engage in problem solving or conduct scientific inquiries.
Examples: biotechnology, astrophysics, climatology, chemical engineering, entomology, planetary geology…

SLO D2:

Integrate knowledge from various disciplines beyond the natural sciences, as necessary, in order to complement and represent the scientific worldview.
Examples: the arts, mathematics, language arts, social studies…