

**Division of Natural Sciences  
Natural Science, Computer Science or Mathematics Element**

**General Education Program  
Pacific Lutheran University**

**Framing Language and Program Goals**

The Division of Natural Sciences fulfills a two-fold purpose, preparing its majors for careers as science professionals and providing all students the grounding in the scientific awareness vital for being a citizen in the modern world and participating in a democracy.

To meet this first purpose, the six departments in the division offer rigorous programs in biology, chemistry, geosciences, physics, mathematics, and computer engineering. Inquiry-based learning is emphasized in laboratories, research courses, and capstone projects. The division-wide undergraduate research program supports one-on-one investigations with faculty in which students are immersed in all aspects of actually “doing” science.

To meet the second purpose, both major and non-major courses address the basic philosophy and methodologies of science. This encourages the awareness of the limitations of science as well as an appreciation for its benefits. Courses also attempt to place science and technology in its larger socio-cultural context, connecting developments in one discipline with those in another and with influences outside the sciences.

**General Education Element Description**

**Exploring Nature and Number**

These courses invite exploration of the natural world around and within us and provide expression of our human inclination to order what we see and to think in quantitative terms.

**Natural Science, Computer Science, or Mathematics**

The universe beyond the earth, the earth itself, living organisms, the details of molecules, atoms, sub-atomic particles—all can be awe-inspiring when we have information and know descriptive and mathematical relationships to explain them. To begin to gain an appreciation for this complex world and its relationships, students take one course from the following disciplines:

*Biology: develops an understanding and appreciation for the unit and diversity of life and the integrative nature of biological science.*

*Chemistry: involves the study of matter at the atomic and molecular level. Concepts and tools of chemistry are used to study the composition, structure, reactivity, and energy changes of materials in the world around us.*

*Computer Science and Computer Engineering: sharpens the ability to critically analyze problems and to precisely state the logic of their solutions, whether those solutions are embedded in machine code or neuron connections in an organic brain.*

*Geosciences: studies the Earth’s features, processes, history, human resource use and its impact on the Earth, and geologic hazards and their impact on human societies.*

*Math: develop skills of logical argument, abstract reasoning, pattern recognition, and quantitative analysis necessary for wise citizenship in an increasingly quantitative twenty-first century.*

*Physics: investigates, at the most fundamental level, the structure of matter and the laws of nature at work in our universe.*

**General Education Learning Outcomes**

**The integrative learning objectives to which these learning objectives apply include knowledge, critical reflections, expression, and valuing.**

By completing a course that focuses on natural sciences, computer science, computer engineering, or mathematics, students will be able to do the following:

1. recall and organize basic terminology and information that applies to the particular discipline;
2. describe and explain the concepts that serve as organizing models for the discipline being studied;
3. summarize their understanding clearly in oral or written form; and,
4. identify the social and ethical issues pertaining to the discipline studied.

Alignment to the ILOs

#### **Knowledge Base**

- A broad knowledge of the basic liberal arts and sciences
- An understanding of the interconnections among these basic liberal arts and sciences that provide the broad framework for living with the complexities of life.

#### **Critical Reflection**

- Select sources of information using appropriate research methods, including those employing technology, and make use of that information carefully and critically.
- Consider issues from multiple perspectives
- Evaluate assumptions and consequences of different perspectives in assessing possible solutions to problems.
- Understand and explain divergent viewpoints on complex issues, critically assess the support available for each, and defend one's own judgments.

#### **Expression**

- Communicate clearly and effectively in both oral and written forms.
- Adapt messages to various audiences using appropriate media, convention, or styles.
- Create symbols of meaning in a variety of expressive media, both verbal and nonverbal.

#### **Valuing**

- Articulate and critically assess one's own values, with an awareness of the communities and traditions that have helped to shape them.
- Recognize how others have arrived at values different from one's own, and consider their views charitably and with an appreciation for the context in which they emerged. Develop a habit of caring for oneself, for others, and for the environment.
- Approach moral, spiritual, and intellectual development as a life-long process of making informed choices in one's commitments.
- Approach one's commitments with a high level of personal responsibility and professional accountability.