GECC Life Sciences Course Approval Criteria
Updated November 2023

Course Submission & Review Guidelines will be reviewed by the IAI GECC Life Science Panel every five years, with panel chair discretion to make policy changes as needed.

Submission Requirements

The information listed below must be included in submission materials.

- A current (include the date) representative institutional or instructor's **syllabus** is required. This document must include the course prefix, number, title, catalog description, and credit hours. Indicate if credit hours are based on semesters or quarters. List all required prerequisites or specifically indicate that there are no prerequisites. *NOTE: a course will NOT be approved for GECC Life Sciences codes if it has a required college-level life science course as a prerequisite EXCEPT for a lab course that is a companion to a GECC-approved lecture course with the same course code.*

- **Learning outcomes** should be stated within the syllabus or in a supplemental document.

- **A detailed weekly topical lecture outline** should be included as part of the syllabus or as a supplemental document. In addition, provide a brief but detailed summary of each major topic. **This should go beyond merely listing chapter numbers and titles from the textbook** and should indicate how societal and/or personal issues are integrated throughout the course. A list of textbook chapter numbers and titles is generally not acceptable.

- A detailed laboratory outline is required for courses seeking a lab course code (L). This should include a description of the activities that students will be engaged in during EACH lab period and should be provided for all delivery modes. These descriptions should highlight the development of science process skills in the lab as detailed in the Evaluation Criteria section below. The detailed description of the lab activities is not the same as learning outcomes. While learning outcomes can be useful for all, they do not satisfy this requirement. Include the total number of lab contact hours for the course. (In general, a 1-semester credit hour lab course should equal between 30 – 45 actual lab contact hours). *NOTE: If the lab course is a separate, stand-alone course, the co-requisite lecture course should also be submitted or recently approved by the panel. Be sure to indicate the lecture course title and course number clearly on the course syllabus.*

List all **textbooks, learning resources, and lab manuals** used. If different sections of the course use different texts, list all texts. If a course uses lab materials that are prepared in- house, or if a custom lab manual is used, submit complete copies of **three representative labs**. Texts reflect and support writing, speaking or content outcomes and requirements. As institutions pursue the opportunity to expand into online/open resource electronic text material, the panel has sought to provide some necessary guidance on citing these learning resources in submitted syllabi and documents. If any online reading or resource materials are used, provide accessible evidence which may be a complete working URL or bibliographic citation. This site/resource must be active, working, and viewable by the panel. Active hyperlinks are acceptable but cannot be embedded in an online learning system.

Evaluation Criteria for GECC Life Science Courses

The panel uses the IBHE general education definition as a guideline for evaluating courses for a GECC Life Sciences course code:

*"The general education curriculum constitutes that part of an undergraduate education that develops **breadth of knowledge** and the expressive skills essential to more complex and in-depth learning throughout life. To develop breadth of knowledge, general education courses acquaint students with the **methods of inquiry** of the various academic disciplines and the different ways these **disciplines view the world**. The academic disciplines comprising the general education curriculum are the physical and life sciences, the humanities and fine arts, the social and behavioral sciences, and interdisciplinary combinations of these. To develop expressive skills, the general education curriculum requires courses that enhance written and oral communication and quantitative reasoning skills."*

pg 5, THE ILLINOIS ARTICULATION INITIATIVE: REVISED GENERAL EDUCATION CORE CURRICULUM AND AN ADDITIONAL BACCALAUREATE MAJOR ENDORSEMENT, June 6, 2000.
http://www.ibhe.state.il.us/Board/agendas/2000/June/item05.pdf

GECC Life Sciences courses are likely the last biology course a student will ever take. Therefore, the panel has articulated three foundational pillars that we believe constitutes a sound general education life science course that will provide students with the knowledge and skills needed to be informed citizens and decision-makers.

- Breadth of Biological Content
- Integrated Societal/Personal Component
- Exposure of Students to the Science Process Skills

Breadth of Biological Content

A course must cover a breadth of foundational biology concepts including topics in molecular and cellular biology, organismal biology (which can include structure/function) and supra-organismal biology (evolution, ecology, biodiversity) as appropriate to the specific course code. While courses under certain course codes may emphasize one of these areas more than the others, all three must be present in order to provide students with a knowledge of the scope of biology.

Integrated Societal Component

Societal and personal topics relevant to the biological concepts presented in the course must be present in GECC Life Sciences courses. Relationships between biological sciences and society must be integrated into the course description, learning outcomes and objectives, and most major lecture units. THIS INTEGRATION MUST BE CLEARLY EVIDENT IN THE SUBMISSION MATERIALS. The panel will not assume or read into a syllabus that these topics are there. In addition, **the societal component must be at least 25% of the course content and should be highlighted within the detailed topical outline provided to the panel.** This societal component is required of every course approved for the GECC Life Sciences panel, no matter the specific descriptor requested.

Integrated Science Process Skills

The National Science Education Standards defines scientific inquiry and integrated scientific process skills as "the diverse ways in which scientists study the natural world and propose explanations based on the evidence derived from their work".

All GECC Life Science courses should provide students with opportunities to engage in integrated science process skills. As such the panel expects to see evidence of active student engagement in a variety of science process skills in general education life sciences courses.

Accordingly, integrated science process skills (scientific inquiry) in all GECC Life Sciences courses should challenge students to:

- Access, evaluate, integrate and document scientific information
- Develop logical arguments with evidence
- Recognize the importance of inference and interpretation
- Address and use the concepts of theory, hypothesis, law, and fact, and the dynamic nature of science
- Use appropriate methods of critical thinking to investigate scientific or societal issues and engage in informed, rational decision-making

Evidence of Integrated Science Process Skills Development in IAI General Education Courses

Integrated science process skills are often among the skills-based learning objectives found at institutions of higher education. As such the panel expects to see evidence of science process skills in general education life sciences courses.

A. Lecture

Examples of integrated science process skills development in a lecture include but are not limited to:

- Examination, analysis, or discussion of authentic data sets.
- Analysis and interpretation of graphs and other visual representations of data.
- Reading and analyzing scientific investigations; identifying components of a scientific investigation by reading either primary literature itself or a summary from a reputable source (i.e. Science News).
- Reading, analyzing, and discussion of the presentation of science topics in general media.
- Identifying sound, and unsound, or biased, sources of science information in the media.

Any of the above can be accomplished through active learning exercises, small group, whole class, or online discussions, or through outside-of-class assignments.

In a lecture-only course, student engagement in a variety of the above activities should be represented in the lecture topical outline in at least 25% of course topics or units.

In a combined lecture-lab course, scientific process skills should be covered in the lab portion, and may optionally be covered in the lecture.

B. Lab

In a lab course, students should be engaged in active, hands-on development of integrated science process skills in three broad areas:

1) Making Observations, Generating Hypotheses, and Making Predictions
- Making scientific observations
- Asking scientific questions
- Developing hypotheses
- Making predictions

2) Designing Investigations and Conducting Experiments
- Designing and conducting investigations
- Identifying variables in experiments
- Collecting authentic data from an investigation conducted by the students

3) Analyzing Data and Evaluating Conclusions
- Performing statistical analysis
- Organizing and presenting data in tables and/or graphs
- Drawing conclusions about hypotheses using data
- Communicating about an investigation, results, and conclusions through written assignments or oral presentation

Active student engagement in a substantial number of the above activities from each of the three areas must be evident across 50% or more of the lab portion of the course.

Because science process skill development is by necessity an active, hands-on process, a course may not be approved if more than 25% of the labs are comprised of non-lab and/or non-hands-on activities including simulations, worksheets, movies/videos, discussions, guest speakers, field trips, demonstrations, reviews, and exams in any combination.

A laboratory course offered in a remote delivery mode must demonstrate that student outcomes related to science process skills development are comparable to a face-to-face course for the panel to approve it. The above ratios limiting simulations and other non-hands-on activities apply to online / remote delivery courses.

Interdisciplinary Physical and Life Science Courses

All courses accepted for the interdisciplinary physical and life science codes (LP 900, LP 901) must demonstrate that physical and life science approaches are emphasized roughly equally throughout each of the two courses. All submissions for LP 900 and LP 901 must include both courses for approval in this category; single course submissions will be returned without review.

Course that will not be approved for GECC Life Science codes
Examples of courses that will not be approved for lack of content breadth include:
Introductory majors' courses in botany and zoology (more than 50% of curriculum is focused on taxonomy and structure function)
Microbiology, and Human Anatomy and Physiology courses designed as major courses, service courses, or prerequisites for Allied Health programs (these courses typically have highly specific content and lack coverage of general science concepts such as heredity, evolution and ecology and lack an integrated societal component)
Introductory, applied or service courses in disciplines other than biology (e.g. animal science, crop science, biotechnology, forensics, nutrition, horticulture)