GECC Life Sciences Course Approval Criteria
Updated October 2021

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 brief but detailed description of the activities that students will be engaged in during EACH lab period. Also 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
- 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.

Science Process Skills

All GECC Life Science courses should provide students with opportunities to engage in science process skills. The National Science Education Standards defines scientific inquiry and 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. Scientific inquiry also refers to the activities through which students develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world."

Accordingly, 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 Science Process Skills Development in IAI General Education Courses

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.

Lecture

Some examples of science process skills in a lecture are **but 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, exploration of some or any of the above topics should be represented in the lecture topical outline.

In a combined lecture-lab course, scientific process skills may be covered in the lab portion, or lecture portion of the course or both.

Lab

Some examples of science process skills in a lab course are **but not limited to**:

- Making scientific observations
- Asking scientific questions.
- Developing hypotheses
- Making predictions
- Designing and conducting investigations
- Identifying variables in experiments
- Collecting authentic data from an investigation conducted by the students
- 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.

An open-ended investigation is one of the ways to accomplish this, but developing these skills individually can also be accomplished through more traditional labs.

Any combination of these types of activities – in their entirety or in part – should appear in approximately 50% of labs resulting in a diverse range of scientific process skills.

Alternative methodologies as defined below, other than traditional hands-on labs, may be used in a lab course. These activities are either active or passive. The use of passive activities is acceptable but should be limited.

Active methodologies include:

- A **computer-assisted lab** is an active exercise where students can manipulate variables or conditions can be modified and different authentic outcomes obtained.
- A **field lab** is an out--of-classroom experience where students are actively engaged in scientific processes.

Passive methodologies include:

- A **computer simulation** is a passive exercise or where the steps are dictated with no room for student choice or mistakes.
- A **demonstration** is watching the instructor or another person perform an experiment
- A **field trip** is a tour or presentation at an out-of-classroom location where students are passively listening or watching.

Course delivery mode (face-to-face, online, hybrid) is not dictated by the panel.

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)

- Highlighted information in this document is changed/updated details added or changed by the panel in the fall 2021 season. These highlights will be removed after the spring 2022 meeting.