Assessment Plan

2021-22

IND - Biology

University Mission: George Fox University, a Christ-centered community, prepares students spiritually, academically, and professionally to think with clarity, act with integrity, and serve with passion.
Program Mission: The Biology Department will promote an environment that encourages students to grow in their understanding of the natural order and its relationship to the spiritual journey, and to use science as the epistemology of the natural world to inform a unified perspective of science, faith and service.
Alignment With GFU Mission: The program mission aligns with the first three Core Themes: Liberal Arts Foundation (biological knowledge), Professional Preparation (skills in scientific investigation, collaboration and communication) and Christ-Centered Community (the role of science in society and the Christian faith).
Degree Outcomes: Program goals for graduates with a B.S. or B.A. in biology:
+ achieve competency in core biological knowledge as recommended by the National Science Foundation & American Association of Science 2011 report "Vision & Change in Undergraduate Biology Education" (www.visionandchange.org) and summarized by the "BioCore Guide" (Brownell, et. al. CBE-Life Sciences Education, Vol 13, 200-211, 2014) to include overarching principles in evolution, information flow, structure-function relationships, transformations of energy and matter, and systems.
+ Demonstrate competency in scientific writing, team participation and collaborating across disciplines.
+ Demonstrate competency in observational strategies, hypothesis testing,experimental design, managing & analyzing experimental evidence and developing problem-solving skills.
+ Evaluate the compatibility of science and faith in their worldview and recognize the benefits of science to societal problems.
Assessment Lead: Jeff Duerr

Outcome: Core concepts in biological science.

Students will demonstrate understanding of the five core concepts of biology as described in the nationally validated BioCore Guide (2014). The core concepts include: Evolution, Information Flow, Structure-Function Relationships, Transformations of Energy & Matter and Systems.

Outcome Status: Active
OutcomeType: Core Theme #1: Liberal Arts Foundation, Core Theme #2: Professional Preparation
Start Date: 01/01/2019

Assessment Tools

Exam/Quiz - National/State - Biology Major Field Exam (Active)

Target: 50% of students will perform at or above 50th percentile.
Schedule for Data Collection: April
Schedule for Data Analysis & Reporting: May 15 of each year
Related Documents:
mft_testdesc_biology_4gmf.pdf

Exam/Quiz - National/State - GenBioMAPs - Assessment to measure student understanding of Vision & Change core concepts across general biology programs. (Active)

Target: Upward trend of increased performance as students progress through the biology major.
Schedule for Data Collection: Beginning of Fall semester Freshman year, End of Spring semester Sophomore year, End of Spring semester Senior year.
Schedule for Data Analysis & Reporting: May 15 of each year starting May 2020
Related Documents:
GenBioMAPS.pdf

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BioCore.pdf

Related Goals

IND - Biology

Departmental - Students will gain a solid foundation of scientific knowledge consistent with the core concepts and competencies as defined in the NSF/HHMI Vision & Change mandate.

Outcome: Scientific Communication Skills

Understand, interpret, and communicate scientific information.

Outcome Status: Active
OutcomeType: Communication, Core Theme #2: Professional Preparation
Start Date: 11/01/2011

Assessment Tools

Laboratory Research Project - Scientific Writing. BIOL 311 (Ecology and Biodiversity) students will engage in a collaborative, semester-long research project to explore current declines in biodiversity. (Active)

Target: 80% of students will earn a minimum of 4/5 as estimated using project rubric.
Schedule for Data Collection: Each semester.
Schedule for Data Analysis & Reporting: May 15 every year
Related Documents:
Competency_Rubric.pdf

Laboratory Assignment - Team participation (Active)

Schedule for Data Analysis & Reporting: May 15 every year

Related Goals

Mission Elements

Core Theme 1.2 - Campus Climate. Sponsor a wide variety of public lectures, performances, and other events that create and sustain a campus climate in which civil discourse flourishes.

IND - Biology

Departmental - Students will be proficient in scientific communication and collaboration.

Outcome: Scientific Method

Students will understand the basic forms of scientific inquiry.

Outcome Status: Active
OutcomeType: Core Theme #2: Professional Preparation
Start Date: 11/01/2011

Assessment Tools

Laboratory Research Project - Observational strategies, hypothesis testing, experimental design, evaluation of experimental evidence, developing problem solving strategies. Students in BIOL 420 (Cell Biology) will conduct an inquiry-based research project in which students will generate biological questions, hypotheses, experimental design and execution, and data analysis.

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Comprehensive written report will detail knowledge and competencies associated with cell biology, the scientific method, and scientific communication skills. (Active)

Target: 80 % of students will earn at least 4/5 on a cell biology research project rubric.
Schedule for Data Collection: November each year
Schedule for Data Analysis & Reporting: May 15 every year
Related Documents:
Competency_Rubric.pdf

Group Project - Ability to use quantitative reasoning: students will be able to develop and interpret graphs, apply statistical methods to diverse data, apply mathematical models, and manage and analyze large data sets. (Active)

Schedule for Data Analysis & Reporting: May 15 every year

Related Goals

IND - Biology

Departmental - Students will gain a solid foundation of scientific knowledge consistent with the core concepts and competencies as defined in the NSF/HHMI Vision & Change mandate.

Outcome: Science-Faith Integration

Students will be able to evaluate the compatibility of science and faith in their worldview.

Outcome Status: Active
OutcomeType: Core Theme #3: Christ Centered Community
Start Date: 11/01/2011

Assessment Tools

Writing Assignment - Students will reflect on the relationship between scientific exploration of God's Creation and God's written Word. A 500 word guided reflective essay in response to the annual Dalton Lecture will be submitted by each student as part of the curriculum in BIOL 212. (Active)

Target: Each student will receive a minimum score of 8/10 - see rubric.
Schedule for Data Collection: February/March every year
Schedule for Data Analysis & Reporting: May 15 every year
Related Documents:
rubric-reflections.pdf

Related Goals

IND - Biology

Departmental - Students will be able to integrate Science and Christian faith into their worldview.

Outcome: Science & Society

Students will reflect upon the ways in which progress in the biological sciences directly impacts human society.

Outcome Status: Active
OutcomeType: Core Theme #1: Liberal Arts Foundation

Assessment Tools

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Presentation/Performance - Students will evaluate the relevance of social contexts to biological problems and evaluate ethical implications of biological research. BIOL 350 (Genetics) students will participate in a bioethics form focused on genetic disorders and emerging therapeutic technologies. (Active)

Target: Students will earn a minimum of 8/10 on the project rubric.
Schedule for Data Collection: Fall and Spring every year
Schedule for Data Analysis & Reporting: May 15 every year

Related Goals

IND - Biology

Departmental - Students will be able to integrate Science and Christian faith into their worldview.