Entomology

Bachelor of Science

Program Overview

Entomology is the study of insects and their relatives from the cellular to the ecosystem level of organization in such areas as evolution, ecology, physiology, morphology, systematics, toxicology, behavior, and genetics. A significant component of entomology is applying these topics to address the important economic, public health, and environmental impacts of insects. Students typically choose one of two tracks within the Entomology major: Applied Pest Management or Pre-graduate, Pre-medical or Pre-veterinary studies.

Possible career paths include:

- Forensic Investigator
- Military Entomologist
- Pest Clinic Diagnostician
- Pest Management Specialist
- Research Assistant
- Museum Insect Curator
- Pesticide Sales
- Quarantine Officer

Students will take classes in insect physiology, behavior, ecology, taxonomy, toxicology, beekeeping, veterinary and public health entomology, sustainable agriculture, and integrated pest management. Coursework centers on the study of insects and their relatives, offering students a thorough understanding of the biological world. Students will study the entire spectrum of insect biology, from the molecules that compose insects to the integral roles of insects in nature. Many of the courses feature a hands-on laboratory component.

Students are required to choose a minor and participate in an internship experience.

Program Learning Goals & Outcomes

Goal 1.0

Acquire an understanding of insect biology at the molecular, cellular, organismal, population, community, ecosystem, and biosphere levels

Outcome 1.1
Search for common themes and distinctions between insects and other organisms at the molecular, cellular, and organismal levels

Outcome 1.2
Explain the unique ecological roles of insects at the population, community, ecosystem, and biosphere levels

Goal 2.0

Understand the ecosystem threats and services attributed to insects, and understand how they are managed

Outcome 2.1
Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals

Outcome 2.2
Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species

Outcome 2.3
Describe the ecosystem services or beneficial roles that insects serve

Outcome 2.4
Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service

Outcome 2.5
Define the tactics of pest management

Outcome 2.6
Compare the tactics of pest management

Outcome 2.7
Evaluate how tactics can be combined into integrated pest management systems

Goal 3.0

Achieve an understanding of the history and nature of science including hypothesis testing and critical thinking, and the ability to communicate these concepts

Outcome 3.1
Give examples of how entomologists have used the scientific method to answer questions about insects, as well as how insects have been used to explore broader questions about life

Outcome 3.2
Explain how to plan and report a scientific experiment to test a hypothesis

Outcome 3.3
Evaluate the accuracy and scientific basis of entomologic information as reported in a variety of formats, including popular media and scientific publications

Outcome 3.4
Synthesize science-based information about insects in oral and written forms to both peer and lay audiences

The Ohio State University
College of Food, Agricultural, and Environmental Sciences

Assessment Fundamentals

What is assessment?

While there are certainly many answers to this question, in the context of the CFAES academic community, assessment is the practice of evaluating the manner or degree to which students in academic programs in our College are learning.. Academic units and programs within CFAES have developed student learning outcomes, which are statements of the key indicators of student learning in specific programs. Assessment is designed to compare actual student performance to these predetermined student learning outcomes.

Assessment is used to respond to at least two concerns: 1) Are students learning what they are supposed to be learning? and 2) How can educators document that students are learning what they are supposed to be learning? While these two concerns are intertwined, they also fulfill separate functions. Concern one is primarily a question of academics: Are our teaching methods effective? Are our students learning what they should and as well as they should? What can we do to improve student learning? Concern one is aligned with continued improvement of teaching and learning. Concern two is aligned more with the issue of accountability. Education is increasingly being asked and even required to document that students know and can do what we say they can do and simple completion of course, program, and graduation requirements is not enough. Accountability requires that educators show that students can actually demonstrate what they know and can do and merely one grade on a test, a paper, or in a course is not sufficient. Accountability should flow naturally from the focus on teaching and learning.

Why do assessment?

Assessment needs to take place for at least two reasons:
1) Assessment is designed to function as continued improvement for teaching and learning.

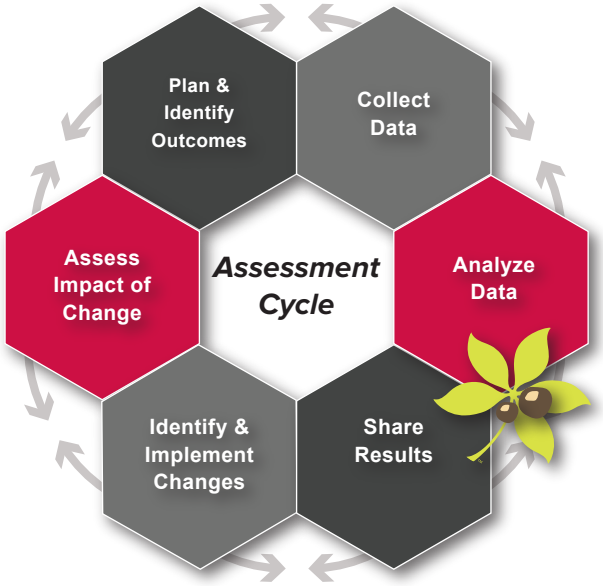
- Assessment helps educators improve the manner and degree to which students learn what they are supposed to be learning.
- Assessment provides information that allows educators to make good decisions based on quality information about student learning.
- Assessment encourages educators to look at what they do in the classroom, how their classroom practices affect student learning, and what changes could be made in teaching methods or materials to enhance student learning.

2) We need to do assessment to remain accountable to the publics we serve.

- Students and their families should be able to see what we do in teaching and learning, and what we expect of students;
- Accrediting agencies need to know that we are effective in our teaching and learning;
- Legislative and executive governmental bodies provide funding and need to know that these funds are accomplishing their intended purposes.

Assessment Cycle

The assessment cycle considers collection and review of data on an ongoing basis to formulate recommendations for incremental programmatic change. Accumulative findings for all program goals based on the contributing outcomes are used as the cornerstones for programmatic review. Assessment provides essential information for making strategic adjustments to the academic program, which assures continuous quality improvement with the intent of improving teaching and learning.



The language of assessment . . .

Goals: Student Learning Goals are stated in terms of achievement resulting from student learning. Goals provide a broad description identifying the foundations, concepts, theories, abstractions, principles, knowledge base, and/or skills, which are the products of what students are to be able to do, know, and care about upon the completion the program. Learning goals are frequently stated using the verbiage of: understand; appreciate; know about; become familiar with; learn about; or become aware of. Reoccurring learning goal concepts/themes for CFAES programs are Critical Thinking, Communications, Academic and Professional Integrity, Diversity, and Knowledge.

The stated learning goals of the programs within CFAES have the inferred prefix of, "***Students will . . .***"

Outcomes: Student Learning Outcomes (SLO's) {also commonly referred to as Expected Learning Outcomes (ELO's) or "objectives"} are statements indicating changes in knowledge, skills, behaviors, attitudes, or values relative to a desired goal as a result of a specific activity, such as completion or participation in a program, activity, course, or project. Cognitive learning outcomes can most effectively be stated using verbs aligned with one of the six domains of the Bloom's Taxonomy of Educational Objectives (Remembering, Understanding, Applying, Analyzing, Evaluating, or Creating). Appropriately structured outcomes serve as the supportive methods/means of measuring student attainment of the associated learning goal.

The stated expected learning outcomes of the programs within CFAES have the inferred prefix of, "***Students will have the ability to . . .***"

Assessment & Curriculum Connection

Assessment results are used in concurrence with the program curricular map to form the underpinning for informing curricular decisions and to further enhance student learning. Curricular mapping demonstrates the opportunities for students to be introduced to knowledge (beginning), opportunities for reinforcement of knowledge (intermediate), and opportunities for students to demonstrate mastery of knowledge (advanced) relative to the stated programmatic learning goals.

	Program Learning Goals B=Beginning, I=Intermediate, A=Advanced		
Courses	Acquire an understanding of insect biology at the molecular, cellular, organismal, population, community, ecosystem, and biosphere levels	Understand the ecosystem threats and services attributed to insects, and understand how they are managed	Achieve an understanding of the history and nature of science including hypothesis testing and critical thinking, and the ability to communicate these concepts
ENTMLGY 1101 *Insect Biology*	***B*** 1.1 **Search** for common themes and distinctions between insects and other organisms at the molecular, cellular, and organismal levels 1.2 Explain the unique ecological roles of insects at the population, community, ecosystem, and biosphere levels	***B*** 2.3 Describe the ecosystem services or beneficial roles that insects serve	
ENTMLGY 1111 *Biology of Insects, Animals & Fungi Affecting Buildings*	***B*** 1.1 **Search** for common themes and distinctions between insects and other organisms at the molecular, cellular, and organismal levels 1.2 Explain the unique ecological roles of insects at the population, community, ecosystem, and biosphere levels		
ENTMLGY 1260 *Introductory Insect Field Biology*			***B*** 3.1 Give examples of how entomologists have used the scientific method to answer questions about insects, as well as how insects have been used to explore broader questions about life
ENTMLGY 2101 *Insects and Human Affairs: Pests, Plagues, Poisons and Politics*	***B*** 1.1 **Search** for common themes and distinctions between insects and other organisms at the molecular, cellular, and organismal levels 1.2 Explain the unique ecological roles of insects at the population, community, ecosystem, and biosphere levels	***B*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.4 Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service	***B*** 3.1 Give examples of how entomologists have used the scientific method to answer questions about insects, as well as how insects have been used to explore broader questions about life
ENTMLGY 2200 *Beekeeping*		***B*** 2.3 Describe the ecosystem services or beneficial roles that insects serve 2.6 Compare the tactics of pest management	
ENTMLGY 3330 *Social Insects*	***B*** 1.2 Explain the unique ecological roles of insects at the population, community, ecosystem, and biosphere levels		
ENTMLGY 4000 *(Previously 3000) General Entomology*			***B, I, A*** 3.1 Give examples of how entomologists have used the scientific method to answer questions about insects, as well as how insects have been used to explore broader questions about life 3.2 Explain how to plan and report a scientific experiment to test a hypothesis 3.3 Evaluate the accuracy and scientific basis of entomologic information as reported in a variety of formats, including popular media and scientific publications
ENTMLGY 4191 *Internship Experience in Entomology*			***A*** 3.4 Synthesize science-based information about insects and explain it in oral and written forms to both peer and lay audiences
ENTMLGY 4440H *Honors Social Insects*	***B*** 1.1 **Search** for common themes and distinctions between insects and other organisms at the molecular, cellular, and organismal levels 1.2 Explain the unique ecological roles of insects at the population, community, ecosystem, and biosphere levels		***I*** 3.3 Evaluate the accuracy and scientific basis of entomologic information as reported in a variety of formats, including popular media and scientific publications

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ENTMLGY 4601 *General Insect Pest Management*		***B, I, A*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.2 Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species 2.3 Describe the ecosystem services or beneficial roles that insects serve 2.4 Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service 2.5 Define the tactics of pest management 2.6 Compare the tactics of pest management 2.7 Evaluate how tactics can be combined into integrated pest management systems	***B, I*** 3.2 Explain how to plan and report a scientific experiment to test a hypothesis 3.4 Synthesize science-based information about insects and explain it in oral and written forms to both peer and lay audiences
ENTMLGY 4602 *Urban Landscape and Greenhouse Entomology*		***B, I, A*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.2 Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species 2.3 Describe the ecosystem services or beneficial roles that insects serve 2.4 Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service 2.5 Define the tactics of pest management 2.6 Compare the tactics of pest management 2.7 Evaluate how tactics can be combined into integrated pest management systems	
ENTMLGY 4603 *Agricultural Entomology*		***B, I, A*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.2 Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species 2.3 Describe the ecosystem services or beneficial roles that insects serve 2.4 Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service 2.5 Define the tactics of pest management 2.6 Compare the tactics of pest management 2.7 Evaluate how tactics can be combined into integrated pest management systems	***B, I*** 3.2 Explain how to plan and report a scientific experiment to test a hypothesis 3.4 Synthesize science-based information about insects and explain it in oral and written forms to both peer and lay audiences

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ENTMLGY 4604 *Urban Entomology*		***B, I, A*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.2 Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species 2.3 Describe the ecosystem services or beneficial roles that insects serve	***A*** 3.4 Synthesize science-based information about insects and explain it in oral and written forms to both peer and lay audiences
ENTMLGY 4606 *Introduction to Forensic Entomology*		***B, I, A*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.2 Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species 2.3 Describe the ecosystem services or beneficial roles that insects serve 2.4 Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service 2.5 Define the tactics of pest management 2.6 Compare the tactics of pest management 2.7 Evaluate how tactics can be combined into integrated pest management systems	
ENTMLGY 4607 *Veterinary Entomology*		***B, I, A*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.2 Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species 2.3 Describe the ecosystem services or beneficial roles that insects serve 2.4 Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service 2.5 Define the tactics of pest management 2.6 Compare the tactics of pest management 2.7 Evaluate how tactics can be combined into integrated pest management systems	

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ENTMLGY 5110 *Ecology and Management of Pathogens and Insects Affecting Trees in Forest and Urban Environments*		***B, I, A*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.2 Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species 2.3 Describe the ecosystem services or beneficial roles that insects serve 2.4 Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service 2.5 Define the tactics of pest management 2.6 Compare the tactics of pest management 2.7 Evaluate how tactics can be combined into integrated pest management systems	
ENTMLGY 5420 *Insect Behavior: Mechanisms and Function*	***B*** 1.1 **Search** for common themes and distinctions between insects and other organisms at the molecular, cellular, and organismal levels		
ENTMLGY 5600 *Principles and Applications of Integrated Pest Management*		***A*** 2.7 Evaluate how tactics can be combined into integrated pest management systems	
ENTMLGY 5601 *Current Topics in Entomology, Science and Society*	***B*** 1.2 Explain the unique ecological roles of insects at the population, community, ecosystem, and biosphere levels		***B, I, A*** 3.1 Give examples of how entomologists have used the scientific method to answer questions about insects, as well as how insects have been used to explore broader questions about life 3.2 Explain how to plan and report a scientific experiment to test a hypothesis 3.3 Evaluate the accuracy and scientific basis of entomologic information as reported in a variety of formats, including popular media and scientific publications 3.4 Synthesize science-based information about insects and explain it in oral and written forms to both peer and lay audiences
ENTMLGY 5604 *Capstone Course: Problem-Based Studies in Plant Health*			***B, I, A*** 3.1 Give examples of how entomologists have used the scientific method to answer questions about insects, as well as how insects have been used to explore broader questions about life 3.2 Explain how to plan and report a scientific experiment to test a hypothesis 3.3 Evaluate the accuracy and scientific basis of entomologic information as reported in a variety of formats, including popular media and scientific publications 3.4 Synthesize science-based information about insects and explain it in oral and written forms to both peer and lay audiences

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ENTMLGY 5605 *Human Health Entomology*		***B, I, A*** 2.1 Identify ecological, physiological, and molecular factors that allow some arthropod species to become pests of crops, forests, landscapes, human health, or domestic animals 2.2 Discuss how the formation of management guidelines for crops, forests, landscapes, human health, or domestic animals is affected by the presence of pest species 2.3 Describe the ecosystem services or beneficial roles that insects serve 2.4 Explain how understanding of insect biology can be used to devise tactics to manage pest populations and to promote insects' ecosystem service 2.5 Define the tactics of pest management 2.6 Compare the tactics of pest management 2.7 Evaluate how tactics can be combined into integrated pest management systems	
ENTMLGY 5623 *Insect Morphology*	***B*** 1.1 **Search** for common themes and distinctions between insects and other organisms at the molecular, cellular, and organismal levels		

Assessment Methods

Achievement of program learning goals are assessed systematically utilizing the identified means for the aligned learning outcomes via direct and indirect measures that serve as authentic assessment methods.

Direct

Direct assessment methods are means of assessment that measure students' performance directly, are authentic, and minimize mitigating or intervening factors. In general, direct assessment methods are assessment tools that measure student learning by having students create or perform directly based on their learning. Direct methods are the direct evaluation of aggregate student achievement on specific learning outcomes.

Indirect

Indirect assessment methods are means of assessment that are steps removed from direct methods and are based upon perception of student learning from various constituents. In general indirect assessment methods infer whether learning has taken place by asking for perception of learning, typically from students, but also from those with whom they have worked. Indirect methods are tools that enable us to infer actual student achievement, very often from student self-reports of their perception of their learning.

Within the Entomology program's assessment plan, the following methods have been identified as means of assessing student attainment of state learning outcomes:

Direct
Embedded Testing Student work in designated courses is collected and assessed in relation to the program learning outcomes, not just for the course grade. The assessment may be conducted at specific points in a program and the products of student work need to be considered in light of the multiple dimensions of the learning outcomes.
Other Direct Measure Specific course assignments also serve as assessment methods for appraising students' ability to evaluate situations while collecting accurate information to make sound decisions and solve problems.
Internship/Externship Experience outside of course meetings that allows student to expand on knowledge and personal experience in specific area of study. Consists of projects, shadowing, and support work. Student can focus in specific field/area of study.
Writing Assignment Written display of comprehension of course topic(s). This can be done through a research report, essay, journal entry, creative writing piece, or another suitable writing method.
Laboratory Report A report generated after the student completes designated experiment, process, research, or other laboratory procedure. The report should outline steps taken, materials used, methods, and results. This shows a student's comprehension of laboratory procedures and methods and ability to implement learned methods.

Table Continued on Back . . .

Scaffolding to Support Learning Outcomes Assessment

The primary purpose of program learning outcomes assessment is to assure that all students have the opportunity to learn what is truly valued by the program. It is not enough to simply collect data for the programmatic learning outcome assessment; these data must be used to reflect and examine whether learning expectations are being obtained and when weaknesses are discovered, needed changes are determined. Educators must remember that the foremost purpose of learning outcomes assessment is for programs to continually be improving the quality of the teaching and learning experiences that enable significant learning.

To assure that all students have the opportunity to learn what is truly valued by the program, the program must engage all faculty and instructional staff at some level of the assessment process. To be successful a program must also have leadership and a supportive scaffolding structure in place to facilitate its assessment efforts.

Overview

The 2012 *Entomology - BS* program assessment plan was crafted under the leadership of the unit assessment contact(s) for Entomology located on the Ohio State Columbus campus. The CFAES Office for Teaching, Learning, and Assessment coached the program's learning outcomes assessment plan development team through the process by: 1) Elucidating program learning goals and developing measurable contributing outcomes; 2) Identifying the means and methods by which the embedded assessment of learning outcomes will be achieved; 3) Defining programmatic criteria for student achievement of each identified outcome; and 4) Planning for the use and implementation in the process of generating the comprehensive program learning outcomes assessment plan.

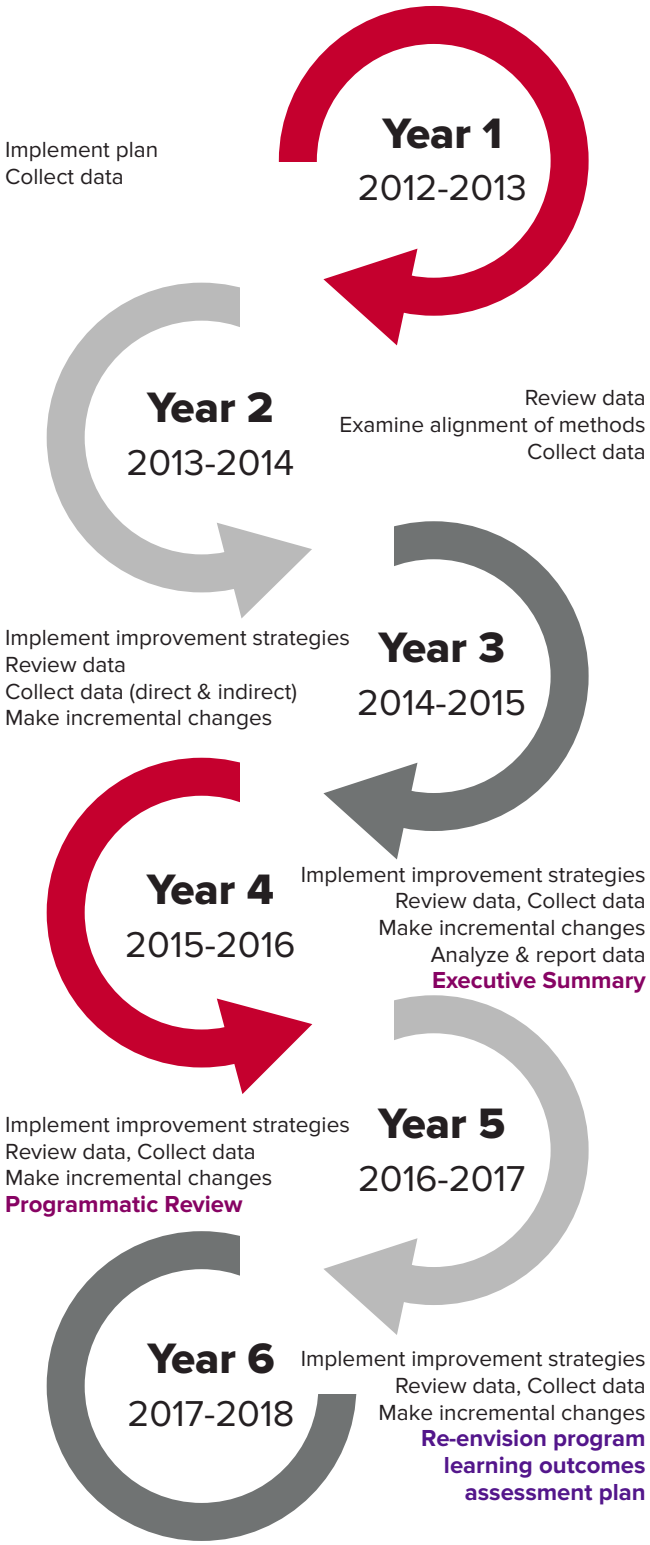
Commitment

Development, implementation, documentation and reporting associated with the *2012 Entomology - BS program learning outcomes assessment plan* are coordinated through academic unit's assessment contact(s) with adherence oversight and support provided by the CFAES Office for Teaching, Learning, and Assessment. Data collection is a collaborative endeavor between the unit's assessment contact(s), course instructors and academic advisors, and students. The assessment contact(s) partners with the CFAES Office for Teaching, Learning, and Assessment to collect, report, and review results on the basis of the Ohio State's annual assessment reporting cycle. The assessment contact(s), Entomology program, the Entomology Divsion, and course instructors are to review the program, its supporting coursework, and the related assessment results annually, on an ongoing basis, to formulate recommendations for incremental programmatic change to the unit's Academic Affairs Committee. With the goal of improving learning, instruction, and curriculum, indicators from a summary report of the findings are to be used to plan the incorporation of needed modifications. Accumulative findings for all program goals based on the contributing outcomes will be used as the cornerstone in the programmatic review cycle, providing essential information for making strategic adjustments to this academic program, assuring continuous quality improvement.

Continued Assessment Methods Table . . .

Direct
Other Culminating Project Provide samples of student work, such as student papers and projects, from a variety of courses that are evaluated to see how well students are applying knowledge and skills to meet program goals.
Indirect
Exit Interview A final interview with a student regarding their experience with coursework, an internship/externship, practicum, or other related experience. The interview may be conducted in person, over the phone, through chat or email, or in an online survey.

Implementation – Six-Year Schedule



The data collection for the identified direct methods of the supporting learning outcomes is conducted annually (or each semester the affiliated course(s) or activities are conducted) starting Au2012. In adherence to the CFAES Academic Program Assessment Plan Revision Cycle (presented and adopted at the December 01, 2011 meeting of the CFAES Committee on Academic Affairs) this program will go through a comprehensive outcomes assessment review every six years.

During the first year of implementation of a new (or re-envisioned) program assessment plan, focused attention will be given to refining the measures used for assessing achievement to assure alignment of identified assignments with outcomes. During the initial year of the plan, the program will collect and report supporting data for half of the documented learning goals.

In year two, focused efforts will explore and reexamine alignment of methods with specific program learning outcomes along with data collection and reporting on the remainder of the program learning goals (those not addressed previously).

During the third year, in addition to collecting and reporting data for all program learning goals, the program will explore conducting faculty facilitated student, alumni, and/or stakeholder focus groups and/or surveys to aid in assessing success of learning outcomes.

For year four of the cycle, supporting data will continue to be collected and reported for all program learning goals. Upon conclusion of the academic year, the academic unit, with the assistance of the CFAES Office for Teaching, Learning, and Assessment, will craft and submit to the College's Academic Affairs Committee. An executive summary of findings for the programs based on the four years of Program Assessment Plan data collected.

In the fifth year of the cycle the program will continue collecting and reporting data for all program learning goals and the program coordinator will review the stated set of program learning goals to determine if modifications should be made in the forthcoming rendition of the program assessment plan.

During year six, data collection and reporting for all program learning goals will continue. In addition, the unit, upon notification from the CFAES Office for Teaching, Learning, and Assessment will work with the academic unit's assessment contact(s) to assemble and convene a formal programmatic assessment review team, comprised of faculty, staff, students, alumni, and stakeholders, to do the following program evaluation: 1) Review the accumulated findings from the assessment review cycle; 2) Appraise the achievement and success of the program; 3) Examine alignment of program learning goals and outcomes; and 4) Produce a summary of recommendations for program modifications and enhancement. The efforts of the team's comprehensive review of the individual Program Assessment Plan in "year six" will produce a "re-envisioned" plan.

Assessment Findings

Reporting Synopsis

Data from identified methods (measures) were collected and reported as evidence of achievement of program learning goals via supporting outcomes (objectives) for the 2012-2016 assessment reporting cycles. Collectively in periodic meetings (review colloquy) the CFAES Office for Teaching, Learning, and Assessment and the assessment contact for the Entomology program elaborated upon the process by which the program was going to review and use evidence (findings/results). They also discussed the procedure which was going to be followed for taking future actions and examined the approach for future planning for the program. One of the primary topics of discussion at these meetings was exploring how the information gathered about student learning was to be shared with the division's faculty, instructional staff, and leadership, and how to use it for improvement of learning outcomes.

This document, the *Assessment Excutive Summary* which is a collaborative report compiled from the information submitted by the academic unit's assessment contact(s) to the Office for Teaching, Learning, and Assessment, is to serve as a mechanism for sharing the status of the program's assessment activities and results with the program faculty and instructional staff, unit and college leadership, stakeholders, the unit's Committee on Academic Affairs, the college's Assessment Committee and CFAES Committee on Academic Affairs.

This summary covers 35 of the 50 identified methods for the 13 supporting outcomes of the 3 program learning goals of this program learning outcomes assessment plan were reviewed during the 2012-2016 assessment reporting cycle.

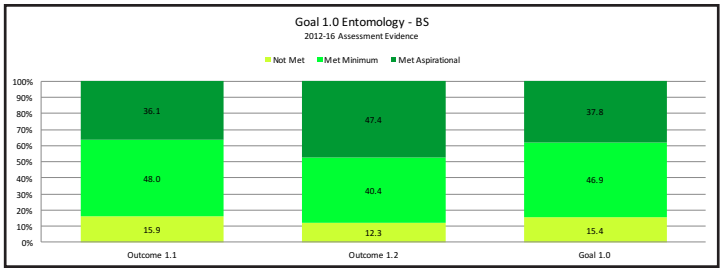
Use of Assessment Findings

Use and Actions Taken

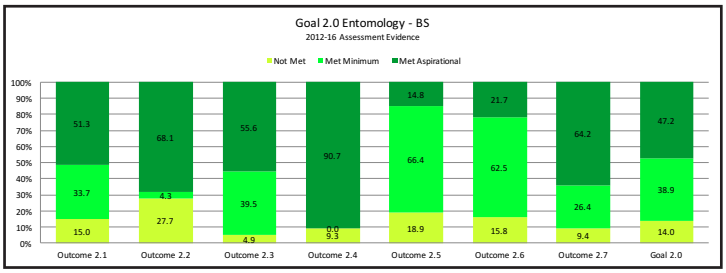
Any changes and/or modifications to this program and/or its learning outcomes assessment plan resulting from these assessment results were explored while reflecting upon collected and reported assessment data during the annual Autumn semester review colloquy. Resulting desired adjustments were then enacted during the following assessment reporting cycle.

The program's coordinator, assessment contact, the CFAES Office for Teaching, Learning, and Assessment, and other faculty and instructional staff has examined the program, its supporting course work, and the related assessment findings on an ongoing basis to formulate recommendations for incremental change. Areas for which assessment data has and will be used include:

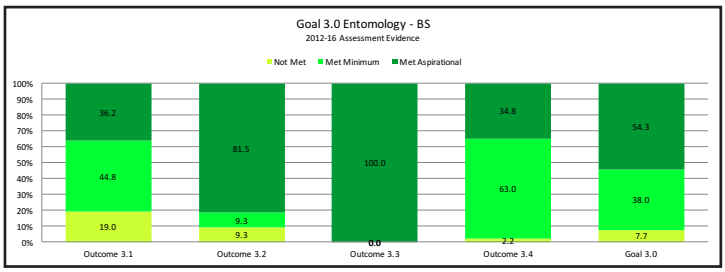
- Analyzing and discussing trends with the unit's faculty
- Analyzing and reporting to college/school
- Making improvements in curricular requirements
- Making improvements in course content
- Making improvements in course delivery and learning activities within courses
- Making improvements in learning facilities, laboratories, and/or equipment
- Periodically confirming that current curriculum and courses are facilitating student attainment of program goals



Learning Goal 1.0 has two identified unique contributing/supporting *Learning Outcomes* for which attainment is appraised via the use of ten assessment methods (student n = 57 for reported assessment methods data)



Learning Goal 2.0 has seven discerned contributing/supporting *Learning Outcomes* for which student achievement is guaged by the use of seventy-nine assessment methods (student n = 344 for reported assessment methods data)



Learning Goal 3.0 has four defined contributing/supporting *Learning Outcomes* for which student performance is assessed by using twenty-five assessment methods (student n = 89 for reported assessment methods data)