

Department: Plant Science  
Program: \_\_\_\_\_  
Date: May 2007  
Updated: \_\_\_\_\_

## Check List:

**Introduction** Completed X Page \_\_\_\_\_

### **Chapter 1**

1.1.a. Developed Program Objective #1 Completed \_\_\_\_\_, Chapter \_\_\_\_\_, Page \_\_\_\_\_

1.1.b Student Learning Outcomes For Program Objective #1

- Developed three to five “measurable” student learning outcomes (SLO).
  - For May 2007 Date Completed \_\_\_\_\_: Chapter \_\_\_\_\_, Page; \_\_\_\_\_
  - For May 2008 Date Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_
  - For May 2009 Date Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

1.2 Student Learning Outcome –Curriculum Alignment Matrix For Program Objective #1

- For May 2007 Developed a course alignment matrix for each SLO.  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

1.3 Assessment Tools/Performance Criteria/ Targets for Program Objective #1

- For May 2007 Developed an assessment plan for each SLO  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

1.4 Results/Analysis/ Recommendations for Program Objective #1

- For May 2007 Developed results, analysis and recommendations for each SLO  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

1.5 Curricular Improvements for Program Objective #1

- For May 2007 Circular process initiated---measure, evaluate, improve, measure  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

1.6 Other Forms of Assessment for Program Objective #1

- For May 2007 Developed an assessment plan using other criteria of student performance  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

**Chapter 2**

2.1.a Developed Program Objective #2 Completed \_\_\_\_\_, Chapter \_\_\_\_,  
Page \_\_\_\_\_

2.1.b Student Learning Outcomes For Program Objective #2

- Developed three to five “measurable” student learning outcomes (SLO).
  - For May 2007 Date Completed \_\_\_\_\_: Chapter \_\_\_\_\_, Page; \_\_\_\_\_
  - For May 2008 Date Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_
  - For May 2009 Date Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

2.2 Student Learning Outcome –Curriculum Alignment Matrix for Program Objective #2

- For May 2007 Developed a course alignment matrix for each SLO.  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

2.3 Assessment Tools/Performance Criteria/ Targets for Program Objective #2

- For May 2007 Developed an assessment plan for each SLO  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

2.4 Results/Analysis/ Recommendations for Program Objective #2

- For May 2007 Developed results, analysis and recommendations for each SLO  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

2.5. Curricular Improvements for Program Objective #2

- For May 2007 Circular process initiated---measure, evaluate, improve, measure  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

2.6 Other Forms of Assessment for Program Objective #2

- For May 2007 Developed an assessment plan using other criteria of student  
performance  
Completed \_\_\_\_\_ Chapter \_\_\_\_\_, Page; \_\_\_\_\_

**Reminder:**

**Progress report deadlines – March 15**

**April 15**

**Final plan due – May 15**

**Key Definitions and Purpose of this Document.**

**The CSU system is requiring development of Student Learning Outcome (SLO) Assessment as part of the larger picture of 5-Year Program Review. SLO Assessment is to be conducted every year as part of the yearly curricular process of:**

<b>Fall, Winter and Spring quarters</b>	<b>gather data for assessment measures, analyze data, determine recommendations for curricular changes</b>
<b>Following Fall quarter</b>	<b>review Expanded Course Outlines to determine where needed curricular changes should be incorporated, develop new curriculum package of curricular changes</b>
<b>Winter quarter</b>	<b>submit curriculum package of changes to College, receive College approval, send approved curriculum package through University cycle</b>

**Traditionally Program Assessment has been the equivalent of 5-Year Program Review based on:**

**A. Broad Program Goals:** Comprehensive and inclusive statements about what the program will do, not what the graduates will achieve. They are not measurable.

**B. Outcome Measures:** Outcome measures are aligned with a Program Goal and are measurable. These measures are data showing graduation rates or completion rates, achievement of students after graduation, etc.

**This Document represents the current view of Student Learning Outcome Assessment as part of 5-Year Program Review which focuses on what students learn, the measurement of that learning and the development of a plan to improve the methods (curriculum) and level of student learning.**

**C. Program Student Objective or Goal:** Similar to program goal but focused on what graduates have achieved from their progress through a curriculum of study.

**D. Student Learning Outcomes:** These are aligned under the Program objective and are measurable. These are measurements of performance of skills, demonstration of knowledge linked to the Program Objective.

**The following template you will complete is not a one-time report.**

## **Introduction to the Program and the Assessment Plan**

*In this section it is important to give an overview description of your academic program so the reader can understand what your program is all about. Keep in mind you will be updating each section every year and will add the information as is outlined below. (The items in parentheses below are examples of how the document will be added to each year but will not be completed by May 2007.)*

### A. Program Mission/Vision as applicable –

(May 2007) The mission of the Plant Science Department is to educate and train competent future leaders in horticulture and agronomic careers along with the associated disciplines of Agricultural Biology, Soils, and Irrigation. This is accomplished by a quality curriculum which features a combination of strong science background along with experiential, student learning centered opportunities which the Department provides via classroom and laboratory activities.

The faculty provide excellent advising in academic and career areas as evidenced by our high job placement rate and large numbers of alumni actively involved in our industries. The Department maintains an excellent retention rate with our students by involving them with the operations of our research programs, farm, nursery and retail store. Our students are also actively involved in industry internships, community service, and cooperative education.

### B. Describe briefly the curriculum and instructional methods your program uses to accomplish your program objectives (i.e. Internships; capstone courses, course sequences, research projects, independent study, service learning etc). –

(May 2007) All majors were dropped and a new Plant Science Curriculum begins in Fall 2007. The curriculum has 4 major course sequences at the freshman, sophomore, junior, and senior levels. Basic science and departmental competencies are featured in the freshman and sophomore years. Two new courses in Research Methodology and New Technologies start the junior year in preparation for capstone senior project/internships and seminar. In addition, upper division science and departmental coursework in Soils, IPM, and Weeds continue in the junior year. The senior year features two departmental capstone courses in Environmental Toxicology and Crop Ecology as well as a college course in Agricultural Ethics.

The curriculum is laboratory intensive which provides experiential learning opportunities. Additional experiences exist via employment on campus in research labs and programs, campus farm, nursery and store.

C. Describe briefly the status of your current updates as a result of your previous assessment cycle

No previous student learning outcome assessment at this level has been developed at the Department level. The Department has 7 years of data from graduates but more at the departmental level. This data is used primarily in 5-year program reviews.

## CHAPTER 1. Program Objective #1 and Student Learning Outcomes (SLO)

*Identify 2 program objectives that should probably be unique to your subject matter/discipline – 1 for Chapter 1 and 1 for Chapter 2. For the Program Objective below, identify 3-5 Student Learning Outcomes for each of the next 3 years. For subsequent years some of the same SLOs from May 2007 may be measured again in 2008 and 2009 or they may be measured every other year or every third year – each program will have to determine what is appropriate for their program and customize this listing for their program.*

### **1.1.a Program Objective #1**

Students will have knowledge of the biotic and abiotic factors that affect plant growth and development

### **1.1.b.1. Student Learning Outcomes for Program Objective #1 – as of May 2007**

#### a. Student Learning Outcome #1

*Describe* California's water resource base and water cycle. Recognize variations in consumptive use patterns in specific plant species (eg. landscape turfgrass, irrigated crops, rangeland, etc.)

#### b. Student Learning Outcome #2

*Identify* basic concepts of plant physiology in relation to climatic variables (eg. temperature, day length, air quality, etc.)

#### c. Student Learning Outcome #3

*Describe* basic soil physical concepts (eg. morphology, texture, structure), chemical concepts (eg. salinity, Ph, nutrient availability) and measures of soil productivity (eg. organic matter, tilth, permeability)

#### d. Student Learning Outcome #4

*Recognize and identify* negative components (eg. weeds, diseases, insects, pests) and positive components (eg. biological N fixation, composting, soil microbes) in plant and soil systems.

#### e. Student Learning Outcome #5

*Recognize* the natural genetic variability within and between species of plants. Describe basic concepts of genomics, plant biotechnology and plant improvement.

## 1.2 Student Learning Outcome-Curriculum Alignment Matrix for Program Objective #1 – as of May 2007

For each SLO identify in which courses are the SLOs introduced, practiced and mastered.

**I** = outcome is introduced    **P** = outcome is practiced    **M** = Outcome is Mastered

Course (number and title)	SLO #1: <i>Describe California's water resource base and water cycle. Recognize variations in consumptive use patterns in specific plant series (eg. landscape turfgrass, irrigated crops, rangeland, etc.)</i>	SLO #2: <i>Identify basic concepts of plant physiology in relation to climatic variables (eg. temperature, day length, air quality, etc.)</i>	SLO #3: <i>Describe basic soil physical concepts (eg. morphology, texture, structure), chemical concepts (eg. salinity, Ph, nutrient availability) and measures of soil productivity (eg. organic matter, tith, permeability)</i>	SLO #4: <i>Recognize and identify negative components (eg. weeds, diseases, insects, pests) and positive components (eg. biological N fixation, composting, soil microbes) in plant and soil systems.</i>	SLO#5: <i>Recognize the natural genetic variability within and between species of plants. Describe basic concepts of genomics, plant biotechnology and plant improvement.</i>
PLT 131 Landscape Horticulture		I	I	I	I
PLT 132 Plant Propagation		I			
PLT 133 Agricultural Cropping Systems	I	I	I	I	I
PLT 231 Basic Soil Science	I	I	P	P	
PLT 232 Irrigation & Water Mgmt	I				
PLT 233 Intro to Arthropods				I	

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PLT 301 Investigative Techniques in Plant Science		P	P	P	P
PLT 302 Technology Innovations in Plant Science	P	P			P
PLT 331 (weeds) Weeds & Weed Control				P	
PLT 332 (fertility) Soil Fertility & Fertilizers			P	P	
PLT 333 (IPM) Integrated Pest Management				P	
PLT 401 Crop Ecology	M	M	M	M	M
PLT 411 Environmental Toxicology	M	M	M		
PLT 441 Internship or	M		M	M	M
PLT 461 Senior Project	M		M	M	M
BOT 124 General Botany		I			
BOT 323 Plant Pathology				P	P
BOT 428 Plant Physiology	P	M			P

(Subsequent year alignment matrices will be inserted here.)



### **1.3. Assessment Tools/ Performance Criteria/ Targets for Program Objective #1 - as of May 2007**

The Assessment Plan will include the following for items for each SLO:

- a. identification of what kinds of assessment tools (i.e., exam questions, project rubrics, oral presentation rubrics, etc.) are going to be used to collect DATA measuring student performance of the outcome
- b. identification of performance criteria (i.e. particular knowledge, or skill or demonstration of concepts, etc.)
- c. identification of the target of expected performance:

#### 1.3.1.a Student Learning Outcome 1.1 May 2007

Describe California's water resource base and water cycle. Recognize variations in consumptive use patterns in specific plant species.

- a. Assessment Tools: Exit examination questions and case study in PLT 401.
- b. Performance Criteria: Student will develop a business feasibility study for a particular crop and address consumptive use and total water. Imbedded questions in exit examination administered to seniors.
- c. Target Performance: 75% of students will demonstrate proficiency (grade 80% or better) on feasibility study and on 5 specific questions on exit examination.

#### 1.3.2.a Student Learning Outcome 1.2 May 2007

Identify basic concepts of plant physiology in relation to climatic varieties.

- a. Assessment Tools: Exit examination questions.
- b. Performance Criteria: Students will answer specific multiple choice questions on impacts of temperature, day length, air quality, light intensity and impact on plant growth.
- c. Target Performance: 75% of students will demonstrate proficiency by correct answers on 5 specific questions.

#### 1.3.3.a Student Learning Outcome 1.3 May 2007

Describe basic soil physical concepts, chemical concepts, and measures of soil productivity.

- a. Assessment Tools: Exit examination questions.
- b. Performance Criteria: Specific questions on soil morphology, texture, structure, salinity, Ph, bulk density, organic matter, tilth, tillage, and permeability.
- c. Target Performance: 75% of students will demonstrate proficiency by correct answers on 11 specific questions.

1.3.4.a Student Learning Outcome 1.4 May 2007

Recognize and identify negative components and positive components in plant and soil systems.

- a. Assessment Tools: identification examination and exit examination questions.
- b. Performance Criteria: From a list of 50 specific pests, students will identify 25 specimens (stations) similar to a laboratory practicum. In addition, specific questions on N fixation, composting, and soil microbes will be included on the exit exam.
- c. Target Performance: 75% of students will demonstrate proficiency by correctly answering 20 out of 25 specimens. In addition, 75% of students will demonstrate proficiency by correct answers on 5 specific questions.

1.3.5.a Student Learning Outcome 1.5 May 2007

Recognize the natural genetic variability within and between species of plants. Describe basic concepts of genomics, plant biotechnology and plant improvement.

- a. Assessment Tools: Imbedded examination question in PLT 302. Exit examination questions.
- b. Performance Criteria: In PLT 302, students must write to describe concepts of plant genomics and biotechnology and impacts on agriculture. A set of 5 specific questions on plant improvement will be included in an exit examination.
- c. Target Performance: 75% of students will score 80% or above in the imbedded test question in PLT 302 to demonstrate proficiency. 75% of students will demonstrate proficiency on the exit examination by correct answers on 5 specific questions on plant improvement.

## **1.4. Results, Analysis and Recommendations for Program Objective #1 – as of May 2007**

Provide the measurable results (data), an analysis (interpretations) and recommendations for general curricular changes (continue data collection, change matrices, develop new course, etc.) related to each SLO for data collected during 2006-2007. (Specific changes to be recorded in Section 1.5)

Data will be collected via tests administered in PLT 463 – Undergraduate Seminar, Spring 2008.

## **1.5. Curricular Changes for Program Objective #1 – as of May 2007**

Describe the curricular changes you will be making in specific courses related to each SLO:

No curricular changes until data has been collected. It is important to note that this is a totally re-worked new curriculum in fall 2007.

**1.6 Other Forms of Assessment for Program Objective #1 – as of May 2007**

Describe any other forms of assessment that you are using to validate any of your SLOs:

None

## **CHAPTER 2. Program Objective #2 and Student Learning Outcomes (SLO)**

*Identify 2 program objectives that should probably be unique to your subject matter/discipline – 1 for Chapter 1 and 1 for Chapter 2. For the Program Objective below, identify 3-5 Student Learning Outcomes for each of the next 3 years. For subsequent years some of the same SLOs from May 2007 may be measured again in 2008 and 2009 or they may be measured every other year or every third year – each program will have to determine what is appropriate for their program and customize this listing for their program.*

### **2.2.a Program Objective #2**

Students will learn management techniques to modify and control factors that affect plant growth and development.

#### **2.2.b.1 Program Objective #2 – as of May 2007**

- a. Student Learning Outcome #1  
Synthesize and implement irrigation strategies that optimize plant growth and conserve water in multiple diverse situations.
- b. Student Learning Outcome #2  
Develop and utilize management strategies and calendars of operations to grow plants under given climatic parameters of an area.
- c. Student Learning Outcome #3  
Analyze and create a recommendation for control of a pest situation (eg. weeds, insects, pathogens) within their given area of emphasis.
- d. Student Learning Outcome #4  
Analyze soil nutrient tests and determine an appropriate strategy to remedy deficiencies.
- e. Student Learning Outcome #5  
Synthesize, implement and demonstrate management, cultural and breeding techniques to produce agronomic and ornamental crops

## 2.2 SLO-Curriculum Alignment Matrix for Program Objective #2 – as of May 2007

For each SLO identify in which courses are the SLOs introduced, practiced and mastered.

**I** = outcome is introduced    **P** = outcome is practiced    **M** = Outcome is Mastered

Course (number and title)	SLO #1: Synthesize and implement irrigation strategies that optimize plant growth and conserve water in multiple diverse situations.	SLO #2: Develop and utilize management strategies and calendars of operations to grow plants under given climatic parameters of an area.	SLO #3: Analyze and create a recommendation for control of a pest situation (eg. weeds, insects, pathogens) within their given area of emphasis.	SLO #4: Analyze soil nutrient tests and determine an appropriate strategy to remedy deficiencies.	SLO#5: Synthesize, implement and demonstrate management, cultural and breeding techniques to produce agronomic and ornamental crops
PLT 131 Landscape Horticulture	I	I	I	I	I
PLT 132 Plant Propagation		I			
PLT 133 Agricultural Cropping Systems	I	I	I	I	I
PLT 231 Basic Soil Science		P		I	
PLT 232 Irrigation & Water Management	P	P			
PLT 233 Intro to Arthropods		P	I		I
PLT 301 Investigative Techniques in Plant Science					P

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PLT 302 Technology Innovations in Plant Science	P				
PLT 331 (weeds) Weeds & Weed Control			P/M		
PLT 332 (fertility) Soil Fertility & Fertilizers				P/M	
PLT 333 (IPM) Integrated Pest Management			P/M		
PLT 401 Crop Ecology	M	M		M	M
PLT 411 Environmental Toxicology		M	M	M	M
PLT 441 Internship OR	M				
PLT 461 Senior Project	M				
BOT 124 General Botany					
BOT 323 Plant Pathology			P		
BOT 428 Plant Physiology	P	M		P	P



## 2.3. Assessment Tools/ Performance Criteria/ Targets/ for Program Objective #2 - as of May 2007

The Assessment Plan will include the following for items for each SLO:

- a. identification of what kinds of assessment tools (i.e., exam questions, project rubrics, oral presentation rubrics, etc.) are going to be used to collect DATA measuring student performance of the outcome
- b. identification of performance criteria (i.e. particular knowledge, or skill or demonstration of concepts, etc.)
- c. identification of the target of expected :

### 2.3.1.a Student Learning Outcome 2.1 May 2007

Synthesize and implement irrigation strategies that optimize plant growth and conserve water in multiple diverse situations.

- a. Assessment Tools: Crop or landscape feasibility project in PLT 401. Exit examination questions.
- b. Performance Criteria: Via the case study in Crop Ecology, the student will prepare plans for a modern, up-to-date irrigation system that will be utilized in the plan. Exit examination questions will be based on crop/soil/water relations, water conservation, precipitation rates, and distribution uniformity.
- c. Target Performance: 75% of students will demonstrate proficiency (grade 80% or better) on feasibility study and 75% of students will demonstrate proficiency by correct answers on 5 specific questions.

### 2.3.2.a Student Learning Outcome 2.2 May 2007

Develop and utilize management strategies and calendars of operations to grow plants under given climatic parameters of an area.

- a. Assessment Tools: Crop or landscape feasibility project in PLT 401. Exit examination questions.
- b. Performance Criteria: Via the case study in Crop Ecology, the student will prepare a business plan on specific areas of Plant Science (eg. turfgrass, landscape maintenance and instruction, crop management). In this study, calendars of operations and managements strategies will be addressed. Exit examination questions will include plant growth and development in varying climatic cycles, CIMIS, and management strategy.
- c. Target Performance: 75% of students will demonstrate proficiency (grade 80% or better) on feasibility study and 75% of students will demonstrate proficiency by correct answers on 5 specific questions.

### 2.3.3.a Student Learning Outcome 2.3 May 2007

Analyze and create a recommendation for control of a pest situation within their specific area of emphasis.

- a. Assessment Tools: Imbedded questions in PLT 331, weeds and weed control and PLT 333, Integrated Pest Management on final exam. Case study in PLT 411, Environmental Toxicology.
- b. Performance Criteria: The final exam of both PLT 331 and PLT 333 required for all majors will focus a question based on developing a written recommendation (essay type question) for a specific weed and pest control situation. The case study in PLT 411 will focus on environmental consequences of fungi, insects, vertebrates and weeds to plant growth.
- c. Target Performance: Proficiency will be demonstrated by 75% of students who will complete the imbedded questions satisfactorily. In the case study, 75% of the students will pass the case study at a level of 80% or higher as a grade. These questions will assist students studying for a PCA Exam.

2.3.4.a Student Learning Outcome 2.4 May 2007

Analyze soil nutrient tests and determine an appropriate strategy to remedy deficiencies.

- a. Assessment Tools: Case study in PLT 411, Environmental Toxicology.
- b. Performance Criteria: The final exam of both PLT 331 and PLT 333 required for all majors will focus a question based on developing a written recommendation (essay type question) for a specific weed or pest control situation. The case study in PLT 411 will focus on environmental consequences of fungi, insects, vertebrates and weeds on plant growth.
- c. Target Performance: Proficiency will be demonstrated by 75% of students completing the imbedded test questions accurately. In the case study, 75% of the students will pass the case study at a level of 80% or higher as a grade.

2.3.5.a Student Learning Outcome 2.4 May 2007

Synthesize, implement and demonstrate management, cultural and breeding techniques to produce agronomic and ornamental crops.

- a. Assessment Tools: Exit examination questions.
- b. Performance Criteria: Questions on exit examination will include the role of plant breeding and improvement in accentuating plant growth and improvement for the future.
- c. Target Performance: Proficiency will be demonstrated by 75% of students successfully completing 5 questions on the exit exam.

## **2.4. Results, Analysis and Recommendations for Program Objective #2 – as of May 2007**

Provide the measurable results (data), an analysis (interpretations) and recommendations for general curricular changes (continue data collection, change matrices, develop new course, etc.) related to each SLO for data collected during 2006-2007. (Specific changes to be recorded in Section 2.5)

Data to be collected in Spring 2008

## **2.5. Curricular Changes for Program Objective #2 – as of May 2007**

Describe the curricular changes you will be making in specific courses related to each SLO:

Changes will be based on data as of 2008.

## **2.6 Other Forms of Assessment for Program Objective #2 – as of May 2007**

Describe any other forms of assessment that you are using to validate any of your SLOs:

2.6.1.a. SLO #1 – as of May 2007

(2.6.1.b SLO #1 – as of May 2008)

2.6.2.a SLO #2 – as of May 2007

(2.6.2.b SLO #2 – as of May 2008)

2.6.3.a SLO #3 – as of May 2007

(2.6.3.b SLO #3 – as of May 2008)

2.6.4.a SLO #4 – as of May 2007

(2.6.4.b SLO #4 – as of May 2008)

2.6.5.a SLO #5 – as of May 2007

(2.6.5.b SLO #5 – as of May 2008)

**CHAPTER 3. Program Objective #3 and  
Student Learning Outcomes (SLO)**

*-Additional chapters to be added over time as additional  
program objectives/SLOs are developed)*