

# UNIVERSITY OF CALIFORNIA, RIVERSIDE

## Student Learning Outcomes for the B.A./B.S. in Plant Biology/Botany & Plant Sciences

Students completing the B.A./B.S. major will be able to:

- demonstrate a broad-based knowledge of Plant Biology at multiple levels.*
  - Students are able to describe key concepts of multiple critical sub-disciplines of Plant Biology, such as plant molecular and cell biology, genetics, biochemistry, anatomy, development, physiology, taxonomy, ecology, and evolution. We anticipate students to be knowledgeable in at least six of the above listed areas by the time of their graduation.
  - Students can integrate across these concepts to make fundamental structure-function linkages and to scale up from the gene to ecosystem levels. For example, students can elaborate on the potential impact of certain genotypic changes on organismal fitness and their performance in their natural environments. Students are further able to describe how mutualistic associations with other organisms (root nodules, mycorrhizae, and pollination syndromes) and defense against pests (microorganisms, nematodes and insects) add to plant success.
  - Students are particularly knowledgeable in a specialty area of Plant Biology which could be (i) plant cellular, molecular, and developmental biology, (ii) plant genetics, breeding and biotechnology, (iii) ecology, evolution, and systematics, (iv) plant pathology, nematology, and pest management, or (v) an adjustment of one of these four specializations to accommodate the interests of a particular student. Students can describe the foundations of their specialty area, exhibit deep knowledge of this area, know how to access primary information relevant to this area and design, analyze and interpret experimental approaches that are standard for the respective area.
- apply critical thinking skills to evaluate existing knowledge and to formulate methods for generating new knowledge.*
  - When faced with a problem or the unknown, students can formulate a hypothesis, design an experiment to test it, analyze the resulting data and critically interpret them.
  - They are also able to draw on existing knowledge in the form of scientific literature, other published materials and online content, judge the relative quality of these sources and use this knowledge to answer questions and set a foundation for generating new knowledge.
- communicate scientific ideas clearly in both written and oral formats.*
  - They can draw on existing knowledge to write a synthetic paper using citations from the scientific literature and are able to summarize scientific information to a lay audience.
  - They can also present new knowledge through oral and written scientific reports and research papers. These skills are developed through classroom and laboratory experiences as well as undergraduate research symposia or workshops.
- apply technical, analytical and computational skills.*
  - Students can perform skilled laboratory and/or field plant biology tasks. This involves the application of experimental methods described in laboratory and/or field protocols and requires them to operate basic analytical equipment. Students are able to explain the functional basis of such equipment.
  - Students can also evaluate quantitative and qualitative experimental data and present such data in tabular or graphical form as appropriate.
  - They are further familiar with standard computer software and can analyze datasets through application of appropriate basic formulae and interpret the results relative to biological principles.
- identify appropriate next career objectives and successfully pursue them.*
  - Students are aware of career options available to them. Typical next objectives will include

employment in industry, government, land management, or teaching; or advanced training in graduate or professional school.

Program Website: <http://cnasstudent.ucr.edu/majors/plantbio.html>