Goals of the USC Biology Undergraduate Curriculum

By graduation students will:

1. **Demonstrate a Base of Knowledge**
   a. Possess a conceptual framework that identifies the relationships between the major domains in the field of biology.

2. **Demonstrate understanding and use of scientific reasoning and process (students should be able to “think like a scientist”)**
   a. Identify assumptions
   b. Create and evaluate hypotheses
   c. Create abstract models of data
   d. Design experiments relevant to the questions and models
   e. Analyze qualitative and quantitative data
   f. Assess validity of work, identify gaps in knowledge
   g. Evaluate the results of the analyses and experiments and decide on next step
   h. Learn from “mistakes” (identify unintended results as opportunities for discovery)
   i. Learn new concepts and integrate them with current knowledge

3. **Demonstrate information literacy and technological fluency**
   a. Locate and evaluate information needed to make decisions, solve problems, design experiments, understand scientific data
   b. Work effectively with common technologies in biology
   c. Read primary literature and evaluate validity (on an appropriate level)
   d. Evaluate and use biological databases (literature and public datasets)

4. **Effectively communicate within a scientific context**
   a. Be able to simplify and explain scientific concepts and results of experiments to a non-biologist (requires sufficient understanding to avoid jargon, half-answers, etc.)
   b. Display and explain scientific results clearly and persuasively to peers both verbally and in writing (includes the ability to graph data appropriately and accurately).

5. **Demonstrate independent and collaborative learning skills**
   a. Be able to learn independently and then share that knowledge with others
   b. Work collaboratively to leverage greater learning than if working alone

6. **Articulate the Nature of Science and its Interface with other Disciplines**
   a. Appreciate the role of creativity in science
   b. Understand the recursive nature of science (how new results continually modify and push forward previous knowledge)
   c. Be able to explain the role of peer review in science as a quality control mechanism
   d. Be able to distinguish the normal level of discussion that occurs at the cutting edge of research from true dissent or controversy over the validity of scientific results.
   e. Have a broad appreciation of the interesting questions, state of knowledge in the field of biology (molecular to ecosystems levels of complexity)
   f. Understand the social and natural context of knowledge (role of science in society, influence of society on science)
   g. Be able to debate the ethical implications of science (difference between our abilities and our values).
   h. Develop an appreciation for the history of ideas and the development of the major fields of biology