The Clemson University Undergraduate
General Education Curriculum

Guidance from the General Education Committee for a course to be included in the *Natural Science with Laboratory* area of the general education curriculum - Crossings:

I.) Criteria to consider in the course syllabus

- Please include the natural science student learning outcome in the syllabus. You may wish to include the outcome verbatim or to describe how the outcome will be delivered in the course section you are teaching.
- Try to make it explicit to the student *why* they are taking this course, that it fulfills a portion of their general education Ways of Knowing requirements. If you wish, a logo is available here that can be used in your syllabus and/ or course materials.
- Please include the weight in determining the students' final grade that will be given to each exam (including the final examination or assessment), paper, report, discussion, project, and/or other learning activity.
    - For the "Ways of Knowing" areas of the general education curriculum, there should be a large percentage of the course content and grade connected to the student learning outcome.
- By Undergraduate Curriculum Committee expectation, the syllabus should have a topical or by-week outline of what the course will cover.
- The signature assignment should be apparent in the syllabus, either in the topical outline or in the grading schema.

II.) Course numbering

Crossings courses in the Ways of Knowing areas should be at the 1000- or 2000-level and should have minimal pre-requisites. We currently have many upper division courses at Clemson that do not follow our UCC course numbering guidelines. Those issues are being addressed over time, so 3000- and 4000-level courses are not prohibited in the Ways of Knowing areas. When possible, please consider removing pre-requisites if they are not necessary and/or adjusting course numbering. Otherwise, a course may not be appropriate as a general education course. (UCC course numbering conventions can be found in the Curriculog document on page 13.)

III.) The *general* nature of general education

There is a special SACSCOC criterion for courses in natural sciences (as well as courses in arts & humanities, mathematics, and social sciences) that "these courses do not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession." We cannot include courses in our general education curriculum for natural sciences that are narrowly focused as described.

IV.) For courses to be reviewed, the "Gen Ed Course Review" form is used in Curriculog. Please follow the advice in this document and on the Course Review page of the Crossings website, along with the specific advice in the Curriculog document, where the Gen Ed Course Review form is detailed starting on page 48. (It is very important to read and follow the expectations in the Curriculog guidelines document.)

In particular, many of our curricula have separated out the 3 hour "lecture" portion and the 1 hour lab portion. It is acceptable to submit the form once for the natural science with lab pair. You should import the course for the lecture portion, but be sure to indicate in the explanation box the course code and number for the group (i.e. – ASTR 1010 and ASTR 1030 or BIOL 1220 and BIOL 1200 or

BIOL 1230 and BIOL 1200). For most natural science with lab pairings, the most natural place for the signature assignment and assessment will be the laboratory portion.

V.) Student learning outcomes and rubric

The student learning outcome and rubric for Natural Science with Laboratory is copied below and are also available on the About Crossings page of the Crossings website.

Student learning outcome: Students will demonstrate the process of scientific reasoning through experimental activity and critical comparison of their results to those predicted by accepted natural science principles.

Rubric for assessing the student learning outcome:

	4	3	2	1
Scientific Reasoning: Experimental activity	Scientific endeavor* and its purpose is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding by the intended audience.	Scientific endeavor* and its purpose is described and clarified so that understanding is not seriously impeded by omissions.	Scientific endeavor* is described, but description leaves some ambiguities.	Scientific experiment* is missing or incorrectly described.
Scientific Reasoning: Evidence and analysis	Evidence from experiment is analyzed and fully interpreted to reveal insightful patterns, differences, or similarities to accepted principles.	Evidence from experiment is analyzed to reveal important patterns, differences, or similarities to accepted principles.	Evidence from experiment is presented, but description leaves some ambiguities.	Evidence from experiment is listed, but is unrelated to accepted principles.
Scientific Reasoning: Conclusions and limitations	Constructs a conclusion based upon sophisticated interpretation of results and hypothesis. Insightfully discusses relevant and supported limitations and implications.	Constructs a conclusion based upon the results and the hypothesis. Discusses relevant and supported limitations and implications.	States a general conclusion somewhat connected to results and hypothesis.	States a conclusion, but it may be ambiguous, illogical, or unsupported.
*Clarification: scientific experiment should be considered broadly. It may involve a number of activities, such as running computer models, identifying substances, classification, observation, field work, building, mapping, etc.				