Natural Science

Students are required to complete two (2) courses in Natural Science. Unless specified by their major department or college, students may choose Natural Science Option 1 of eight credits (two lab science courses) or Option 2 of seven credits (one lab science course and one non-lab science course). With either option, students are not required to take the same science prefix for both courses unless that requirement is specified by their major department or college. Lab science courses cover a core set of laboratory practices and scientific methodology concepts and include a laboratory component for at least one credit.

1. Natural Science Lab-Science Courses

<u>Lab-Science Courses Expected Undergraduate Student Learning Outcomes</u>

Syllabi for courses designed to fulfill the Liberal Studies Natural Science lab-science requirement must provide course content that enables students to achieve the Expected Undergraduate Student Learning Outcomes identified below. Course proposals may identify additional objectives from the list of Expected Undergraduate Student Learning Outcomes as appropriate to the course content.

<u>Informed Learners</u> understand nature and society through forms of inquiry fundamental to the sciences, the humanities, and the arts. Learners are informed by knowledge and ways of knowing that extend beyond core concepts enabling them to link theory and practice.

As *Informed Learners* students will demonstrate knowledge and understanding of:

- the natural world or the ways of modeling the natural, social and technical worlds As

<u>Empowered Learners</u> are critical thinkers who demonstrate intellectual agility and creativity and the ability to manage or create change. They are able to derive meaning from experience and observation. They communicate well in diverse settings and employ various strategies to solve problems. They are empowered through mastery of intellectual and practical skills.

Empowered Learners students will demonstrate:

- problem solving skills using a variety of methods and tools critical thinking skills
- critical thinking skills including analysis, application and evaluation As

<u>Responsible Learners</u> are engaged citizens of a diverse democratic society who have a deep sense of social responsibility and ethical judgment. They are responsible for their personal actions and civic values.

Responsible Learners students will demonstrate:

- intellectual honesty

<u>Lab Science Required Course Content</u>

Courses designed to meet the Liberal Studies Natural Science lab-science requirement must

include content and instruction that provides opportunities for students to:

- examine a body of knowledge of natural science that will contribute to an understanding of the natural world and an appreciation of the impacts that natural sciences have on the lives of individuals and the world in which they live
- understand the difference between science as a knowledge base and science as a process that generates knowledge
- develop an inquiring attitude consistent with the tenets of natural science
- understand the empirical nature of science
- understand the concept of bias and the efforts to which scientists go to avoid it
- to learn the proper application of scientific methodology in an appropriate context

Individuals proposing courses to fulfill the Natural Science non-lab science requirement are encouraged to include course material and instruction in which students:

- develop skills in effective use of oral and written communication as appropriate
- apply problem solving and critical thinking skills to reach conclusions

<u>Lab Science Common Learning Objectives</u>

All courses designed to fulfill the Liberal Studies Natural Science lab-science requirement will establish the following common course learning objectives.

At the conclusion of the course the student should be able to:

- understand a body of knowledge in a science domain
- understand that science knowledge is generated by an empirical approach to nature and analyze problems from the perspective of a natural scientist
- demonstrate an understanding of intellectual honesty in the context of scientific methodology, and contrast science with pseudoscience
- understand how science knowledge is relevant to non-scientists
- use critical thinking skills and scientific methodology.

2. Natural Science Non-lab Science Courses

<u>Non-lab Science Expected Undergraduate Student Learning Outcomes</u>

Syllabi for courses designed to fulfill the Liberal Studies Natural Science non-lab science requirement must provide course content that enables students to achieve the Expected Undergraduate Student Learning Outcomes identified below. Course proposals may identify additional objectives from the list of Expected Undergraduate Student Learning Outcomes as appropriate to the course content.

<u>Informed Learners</u> understand nature and society through forms of inquiry fundamental to the sciences, the humanities, and the arts. Learners are informed by knowledge and ways of knowing that extend beyond core concepts enabling them to link theory and practice.

As *Informed Learners* students will demonstrate knowledge and understanding of:

- the natural world or the ways of modeling the natural, social and technical worlds As

Empowered Learners are critical thinkers who demonstrate intellectual agility and creativity and the ability to manage or create change. They are able to derive meaning from experience and observation. They communicate well in diverse settings and employ various strategies to solve problems. They are empowered through mastery of intellectual and practical skills.

Empowered Learners students will demonstrate:

- problem solving skills using a variety of methods and tools critical thinking skills
- critical thinking skills including analysis, application and evaluation As

Responsible Learners are engaged citizens of a diverse democratic society who have a deep sense of social responsibility and ethical judgment. They are responsible for their personal actions and civic values.

Responsible Learners students will demonstrate:

- intellectual honesty

Non-Lab Science Required Course Content

Courses designed to meet the Liberal Studies Natural Science lab-science requirement must include content and instruction that provides opportunities for students to:

- examine a body of knowledge of natural science that will contribute to an understanding of the natural world and an appreciation of the impacts that natural sciences have on the lives of individuals and the world in which they live
- understand the difference between science as a knowledge base and science as a process that generates knowledge
- develop an inquiring attitude consistent with the tenets of natural science
- understand the empirical nature of science
- understand the concept of bias and the efforts to which scientists go to avoid it

Non-lab Science Common Learning Objectives

All courses designed to fulfill the Liberal Studies Natural Science non-lab science requirement will establish the following common course learning objectives.

At the conclusion of the course the student should be able to:

- understand a body of knowledge in a science domain
- understand that science knowledge is generated by an empirical approach
- demonstrate an understanding of intellectual honesty in the context of scientific methodology, and contrast science with pseudoscience
- understand how science knowledge is relevant to non-scientists
- use critical thinking skills and scientific methodology

Additionally, individuals proposing courses to fulfill the Natural Science lab-science requirement are encouraged to include course material and instruction in which students:

- develop skills in effective use of oral and written communication as appropriate
- apply problem solving and critical thinking skills to reach conclusions.