

**New York City College of Technology**  
**Interdisciplinary Committee**

**Criteria for an Interdisciplinary Course**

**I. Interdisciplinary Studies Definition**

Interdisciplinary studies involve two or more academic disciplines or fields of study organized around synthesizing distinct perspectives, knowledge, and skills. Interdisciplinary study focuses on questions, problems, and topics too complex or too broad for a single discipline or field to encompass adequately; such studies thrive on drawing connections between seemingly exclusive domains. Usually theme-based, interdisciplinary courses intentionally address issues that require meaningful engagement of multiple academic disciplines. Pedagogical strategies focus on, but are not limited to, inquiry or problem-based learning.

Although many academic disciplines, such as African American Studies and Engineering, are inherently interdisciplinary, to be considered an interdisciplinary course at City Tech the course must be team-taught<sup>1</sup> by more than one faculty member from two or more departments<sup>2</sup> in the College. An interdisciplinary course, by definition, has an interdisciplinary theme as its nucleus. In its essence, such a course brings the analytic methods of two or more academic disciplines to bear on a specific problem or question. Thus, a course in Music History is not likely to be considered interdisciplinary, but a course in Music History from an economist's perspective might very well lead to such a course. The application of different methods and concepts is the key to assessing whether a course is or is not interdisciplinary. The term interdisciplinary is occasionally used to identify individual projects or assignments, but these, though possibly commendable, fall short in the necessary scope for learning experiences that demand in-depth exposure to the methodologies of distinct intellectual disciplines, and the creative application of these methodologies to specific problems.

Studies show that interdisciplinary courses improve student learning (Elrod & Roth, 2012; Klein, 2010; Lattuca, 2001; Lattuca, Voigt, & Fath, 2004; Project Kaleidoscope, 2011). To foster interdisciplinary learning, the Interdisciplinary Committee has identified goals and outcomes that students taking interdisciplinary courses should be able to achieve.

**Learning Outcomes of Interdisciplinary Courses**

Students will be able to:

- Purposefully connect and integrate across-discipline knowledge and skills to solve problems
- Synthesize and transfer knowledge across disciplinary boundaries
- Comprehend factors inherent in complex problems
- Apply integrative thinking to problem-solving in ethically and socially responsible ways
- Recognize varied perspectives
- Gain comfort with complexity and uncertainty
- Think critically, communicate effectively, and work collaboratively
- Become flexible thinkers

---

<sup>1</sup> See "Application for Interdisciplinary Course Designation" question 9b for team-teaching options.

<sup>2</sup> Exceptions are made for Departments that provide a home for multiple disciplines, such as Humanities and Social Science.

**New York City College of Technology  
Interdisciplinary Committee**

**Application for Interdisciplinary Course Designation**

Date: *February 16<sup>th</sup>, 2016*

Submitted by: *Tatiana Voza & Geoff Zysltra*

Department(s): *Biological Sciences & Social Science (History)*

**II. Proposal to Offer an Interdisciplinary Course**

1. Identify the course type and title:

☒ An existing course: *Biology II (BIO1201)*

☐ A new course \_\_\_\_\_

☐ A course under development \_\_\_\_\_

2. Provide a course description

*BIO1201 is the second half of First Year General Biology for non-science majors at New York City College of Technology. This course comes with a lecture and a lab component. The course introduces the student to a variety of biological topics fundamental to all living organisms, with a focus on human organ systems. In particular, the course is a survey of organisms belonging to the Domains Archaea and Bacteria and, more extensively, the groups spanning the four kingdoms of the Domain Eukarya. A special focus will be dedicated to higher animal organization, ranging from animal tissues to organs and organ systems, and how these systems compare and contrast among other vertebrates and invertebrates. Throughout the curriculum, interdisciplinary topics, centered around 4 major themes, "History & Scientific Discoveries", "Biology & Industry", "Disease Impact & Public Health Policies", "Science & Race, Gender & Social Status", will be discussed, providing social, historical and economical contexts and connections to biology.*

3. How many credits will the course comprise? *4 credits*. How many hours? *6 hrs/wk (90hrs/sem)*

4. What prerequisite(s) would students need to complete before registering for the course? Co-requisite(s)?

*Biology I (Bio1101) is the only prerequisite*

5. Explain briefly why this is an interdisciplinary course.

*Using discussions and several examples and assignments, the course aims at teaching students how blending biological, social, and cultural disciplines better contextualizes the information in each of these fields and provides them with a greater ability to apply their education in the world beyond college.*

6. What is the proposed theme of the course? What complex central problem or question will it address? What disciplinary methods will be evoked and applied?

*The themes of the course are a) the Social Context for Biology and b) Connections between Biology & Social Science. The course will provide students, the future practitioners of science and technology, with scientific knowledge and the epistemological context of that knowledge in order to effectively operate in a time of rapid scientific and technological change. Four recurring themes, "History & Scientific Discoveries", "Biology & Industry", "Diseases Impact & Public Health Policies", "Science & Race, Gender, Social Status", will be discussed through case studies, books, official documents and assignments.*

Note: We plan on using the following survey, during the 2015-2016 academic year, to collect Biology II students' feedback on such topics:

Please indicate which topics you would like to be included (or covered more thoroughly) if the Biology II course was an interdisciplinary course.  
Feel free to write any comment and details ☺

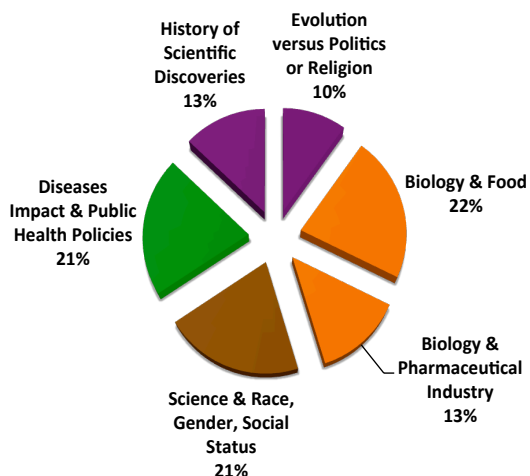
Topics/Themes	Check (one or more)
<b>Evolution versus Politics or Religion</b> <i>Comment:</i>	
<b>Biology &amp; Food</b> <i>Comment:</i>	
<b>Biology &amp; Pharmaceutical Industry</b> <i>Comment:</i>	
<b>Science &amp; Race, Gender, Social Status</b> <i>Comment:</i>	
<b>Diseases Impact &amp; Public Health Policies</b> <i>Comment:</i>	
<b>History of Scientific Discoveries</b> <i>Comment:</i>	
<b>Other</b> (please describe):	
<b>Other</b> (please describe):	

<b>Your major:</b>	
--------------------	--

The survey results for Fall 2015 are shown below for 65 student respondents (~15 % of all students enrolled in the course):

**Survey Results for Fall 2015 (n=65)**



**Enrollment of Student Respondents (Fall 15)**

Program	Students
Accounting	1
Art & Advertising Design	1
Biomedical Informatics	11
Chemical Technology	1
Communication Design	4
Computer Systems	12
Entertainment Technology	1
Graphics Arts Prod Mgt	1
Health Service Admin	1
Hospitality Management	8
Human Services	6
LAA	3
LAS	11
Legal Assistant Studies	3
Nursing	1
<b>Total</b>	<b>65</b>

7. Which general learning outcomes of an interdisciplinary course does this course address? Please explain how the course will fulfill the bolded mandatory learning outcome below. In addition, select and explain at least three additional outcomes.

**☒ Purposefully connect and integrate across-discipline knowledge and skills to solve problems**

*Throughout this curriculum, students will have to understand and apply the scientific method, reasoning and logic while also considering limitations related to technology, beliefs and social environment. Students will have to identify issues inherent to different fields when conducting scientific research. As paths and obstacles leading to biological discoveries, knowledge and applications, will be discussed, students will also be able to reflect on the importance of troubleshooting, failures and negative results in problem solving and breakthrough advances.*

---

**☒ Synthesize and transfer knowledge across disciplinary boundaries**

*Students will learn how society, religious beliefs, economics and politics can impact biology and scientific discoveries and how in turn biological advances and knowledge affect our social experience. Discussions and documents will highlight interactions between Science (and in particular Biology) and other disciplines/fields, providing context and analysis of different case studies and applications.*

---

**☒ Comprehend factors inherent in complex problems**

*This course will allow students to understand that scientific discoveries and knowledge are not obtained linearly. Different levels of complexity and limitations will be studied through discussions on topics such as the history of discoveries, the effect of religion and politics on scientists, and biases in biomedical research.*

---

**☒ Apply integrative thinking to problem solving in ethically and socially responsible ways**

*Being able to see how different aspects of life intersect is important to problem solving and social decision-making. Biology intersects with many parts of our social lives and this course will train students how to recognize these intersections and how to simultaneously think about biology and society when making decisions. Discussions about public policy as it relates to infectious disease, the corporate ownership of genetic information and the ways social categories like race and gender relate to science will enable students to use integrative thinking to make socially responsible decisions.*

---

**☒ Recognize varied perspectives**

*While most people have the perception that scientists focus on finding the truth or the one best solution to a problem, twenty-first century scientists need to think in flexible ways and focus on creating multiple solutions to a problem. By introducing students to philosophers of science like Thomas Kuhn that focus on epistemology (paradigm change in the creation of scientific knowledge) students will see that scientific knowledge is variable and contended. Building on this, students will study the specific experiences of scientists from different social groups and see how social expectations play a role in the lives of scientists and the recognition of their work.*

---

☐ Gain comfort with complexity and uncertainty

---

☒ Think critically, communicate effectively, and work collaboratively

*Two essay assignments, unique in a biology class, will ask students to work alone and in groups to assess both how time and place relate to scientific experimentation and how biology intersects with the rest of society. These essays force students to think about biology and society in new ways and to communicate their thoughts in writing. (See the Evaluation Framework for descriptions of these essays.)*

---

☐ Become flexible thinkers

---

☐ Other

---

### General Education Learning Goals for City Tech Students

- **Knowledge:** Develop knowledge from a range of disciplinary perspectives, and hone the ability to deepen and continue learning.
- **Skills:** Acquire and use the tools needed for communication, inquiry, creativity, analysis, and productive work.
- **Integration:** Work productively within and across disciplines.
- **Values, Ethics, and Relationships:** Understand and apply values, ethics, and diverse perspectives in personal, professional, civic, and cultural/global domains.

8. How does this course address the general education learning goals for City Tech students?

*Upon satisfactory completion of this course, the student will be able to:*

1. *Use Biology as a forum for the study of values, ethical principles, and the physical world.*
  2. *Show curiosity and the desire to learn*
  3. *Engage in an in-depth, focused, and sustained program of study.*
  4. *Employ scientific reasoning and logical thinking.*
  5. *Derive meaning from experience, as well as gather information from observation.*
  6. *Understand and employ both quantitative and qualitative analysis to describe and solve problems, both independently and cooperatively.*
  7. *Understand and navigate systems.*
  8. *Communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means. (Modified)*
  9. *Value knowledge and learning.*
  10. *Demonstrate intellectual honesty and personal responsibility.*
-

9. Which department would house this course<sup>3</sup>? *Biological Sciences Department*

Would all sections of the course be interdisciplinary? ☒ No ☐ Yes

*The course has a lecture and lab component (3hrs/week each), we thus propose to offer one interdisciplinary BIO1201 lecture linked one interdisciplinary BIO1201 lab section. Since lab classes can only hold 24 students, a cap of 24 students (instead of 48) would be needed on the linked lecture section.*

*Linking the lecture and lab sections also ensures that all students have covered the same portions of the syllabus at any given time. Previous experience with summer classes, where lab and lectures are always linked, shows that there is ample time to integrate additional material without compromising on the original BIO1201 course content. This is due to the fact that entire lectures, or lengthy explanation of lab activities, do not need to be repeated to have all students on par.*

*Since this is the first interdisciplinary preexisting science course with a lecture and lab component, we plan on starting with only one lecture and one lab section at first. After this experience, we will be able to develop and offer tested material to other instructors who wish to teach such sections and hence, offer more sections.*

- a) Would the course be cross-listed in two or more departments? ☐ No ☒ Yes Explain.

*The one interdisciplinary section for this course should be listed in both departments: Biological Sciences and Social Science. It is a 4 credits preexisting course from the Biological Sciences department, with a lecture and lab component. It can be taken as a requirement or an elective. As an interdisciplinary course, this section would also fulfill the Pathways Common Core Interdisciplinary Course 3 credits requirement.*

---

- b) How will the course be team-taught<sup>4</sup>? ☐ Co-taught ☒ Guest lecturers ☐ Learning community

If co-taught, what is the proposed workload hour distribution?

☐ Shared credits ☐ Trading credits ☐ NA

---

<sup>3</sup> An interdisciplinary course for the College Option requirement may be housed in a department that is not liberal arts.

<sup>4</sup> Attach evidence of consultation with all affected departments.

Evaluation framework used to assess the interdisciplinarity of the course.<sup>5</sup>:

*Grades: All assessments included, between 25-30% of the final course grade will result from interdisciplinarity evaluation. The regular Biology II (BIO1201) course grading policy will be respected with the final grade being calculated as 60% Lecture and 40% Lab. A final project essay will be added to the lecture grade and will weigh as much as one of the 4 lecture exams. In addition, each lecture exams will have approximately 15-20% questions on interdisciplinary topics. Similarly, 3 lab quizzes will include 15-20% questions on interdisciplinary topics and a group project will count as much as a lab quiz. A detailed breakdown can be found on page 2 of the attached proposed tentative syllabus.*

*Homework Assignments: In addition to the regular textbook reading assignment, students will be asked to read recent articles, book excerpts, view documentaries and webpages and listen to podcasts before class. The different documents will be discussed in class with instructors and between students.*

*Descriptive paper of biological research (lab group project): Groups of 4 students will have to research a case of unusual discovery ("History & Scientific Discoveries" theme) and write a one-page paper to present the case between midterm and the end of the semester. The assignment will be graded and will count as much as a lab quiz (5% of the final course grade). All projects will be posted on Blackboard for all to view and discuss.*

*Below is the information that will be provided to students (in the syllabus):*

**\*\* History & Scientific Discoveries Descriptive Paper (group project)**

Write a 1-page paper describing historical experiments and complications that biological researchers faced as they developed new biological knowledge. If possible consider how the concept of paradigm change discussed earlier in the semester connect with the biological research you will discuss.

**Style and Format**

1 page  
Typed double spaced  
12 pt Times New Roman font or equivalent  
1 inch margins  
Your paper must have a title (the wittier the better)  
Name and section # at the top of page 1 or on the title page  
Use either footnotes or parenthetical citations to cite your sources

**What is a descriptive paper?**

A descriptive paper is a paper that paints a picture of a certain object, event, situation, or issue. These types of papers leave the reader with a clear impression of something they did not know about before. A high quality descriptive paper does not only present facts, but also ties those facts to a larger theme. Better papers will connect the facts of the biological research you describe to a theme present in the relationship between biology and society.

**Structure**

Introduction – A good introduction will contain (1) a catch, (2) a brief description of the topic, and (3) will connect that topic to a larger theme.

Body – This is the portion of the paper where the author presents descriptive information that paints the picture you are trying to create. The paragraphs in the body should flow into each other.

Conclusion – The conclusion of a descriptive paper should briefly capture the most important part of the description and link it to the theme of the paper. In this way the conclusion is not simply a summary, but a blending the information and the theme. Tell the reader how the details you discussed in the body highlight the theme of the paper. Leave the reader with a clear impression of why the topic is important

<sup>5</sup> In the case that a course is equally taught, include proposed plans for faculty classroom observation and student evaluation of teaching.

*End of semester interdisciplinary project (individual): Each student will have to write a short interdisciplinary essay by the end of the term, intersecting with the four different themes. This assignment will be part of the lecture grade and represent 12% of the course grade. Below is the information that will be provided to students (in the syllabus):*

**\* Description of the end of semester Interdisciplinary Essay (individual project)**

Write a 2-page essay describing how biology intersects with social aspects of human life. You can think about this paper in terms of gender, race, public policy, and business or corporate influence.

Select two of the following issues and tie them together with biology in your papers.

- Public Policy
- Race
- Gender
- Business or corporate influence

The best papers will seamlessly integrate the issues you choose with biology in cohesive paper. In other words, you are relating these different issues to each other in a seamless manner. Your paper should not read like two or three separate papers addressing each issue.

**Style and Format**

2 pages  
 Typed double spaced  
 12 pt Times New Roman font or equivalent  
 1 inch margins  
 Your paper must have a title (the wittier the better)  
 Name and section # at the top of page 1 or on the title page  
 Use either footnotes or parenthetical citations to cite your sources

**What is an Essay?**

An essay is an argumentative paper that expresses the author's point of view on a specific topic. Essays are usually both analytical as the author is judging or critiquing something, and also descriptive as the author needs to use facts to prove the accuracy of their opinion.

**Structure**

Introduction – A good introduction will contain (1) a catch, (2) a thesis statement, and (3) will give an indication of how the rest of the paper will be structured.

Body – This is the portion of the paper where the author makes their argument. Here the author presents information that proves the thesis of the paper. The paragraphs in the body should flow into each other.

Conclusion – The conclusion of an essay should explain how the author proved their point. In this way the conclusion is not simply a restatement of the thesis, but a blending the thesis and the body. Tell the reader how the details you discussed in the body proved the thesis in your introduction.

c) What strategies/resources would be implemented to facilitate students' ability to make connections across the respective academic disciplines?

*In additions to in-class discussions and reflections on different recurring themes, students will be exposed to different medias such as podcasts, videos, official websites, book excerpts and articles. They will also be assigned a final project and work in groups to research and present a peculiar discovery.*

10. Would the course be designated as:

☒ a College Option requirement<sup>6</sup>? ☒ an elective? ☐ a Capstone course<sup>7</sup>? ☐ other? Explain.

*Depending on the degree sought, the Biology II course can be taken as part of the Flexible Core (Scientific World) in the General Education Common Core or be taken as a required or elective course for the Program Specific Degree Requirements.*

<sup>6</sup> To qualify for the College Option, such a course must also meet the New York State definition of a liberal arts and sciences course.  
<http://www.highered.nysed.gov/ocue/lrp/liberalarts.htm>

<sup>7</sup> A course proposed as a Capstone course must be separately approved by the Capstone Experience Committee.