



**NEW YORK CITY  
COLLEGE OF TECHNOLOGY**  
The City University of New York  
300 Jay Street • Brooklyn, NY 11201-2983

Application for Designation as an Associate Degree Capstone Course

**Instructions:**

According to the new LAS/LAA associate Capstone policy, the capstone requirement can be met either by taking an approved associate capstone course or, in special cases, by taking an approved independent study. In order for a course or independent study to be given an associate capstone designation, it should be submitted for review. For Spring 2012 consideration, please fill in this form and submit it by \_\_\_\_\_ to \_\_\_\_\_.

Date: May 16, 2012

Name and Number of Course: Physics 3.3 (Modern Physics), PHYS 2443

Department(s): Physics

For department that want new courses to be designated as capstones or want old courses to retain their capstone designation, the Associate Capstone Committee will consider the extent to which the courses in question contribute to the students' intellectual development in the ways outlined below.

In doing so the committee understands that not all of these ways are equally applicable to the various disciplines in the School of Arts and Sciences and that not all of the courses that will qualify as capstones will promote students' intellectual development in every single one of these ways.

<b>Discipline Specific Learning Contribution</b>	<b>Please describe how the course makes this contribution</b>	<b>Please describe how student learning is assessed.</b>
1. Develop skills, values and knowledge beyond the introductory level in one or more disciplines and the ability to deepen and continue learning.	Students extend their mathematical and problem-solving skills to a broader class of physical systems than encountered in first-year physics. This also enables them to practice their laboratory, scientific writing and communication skills at a more in-depth level than done in first-year physics courses. Students gain knowledge about Relativity, black holes, astrophysics and cosmology, quantum mechanics and its applications, nuclear physics and elementary particle physics. All of these topics rely upon a deeper understanding of the basic physics taught in Physics 1441-1442 or 1433-1434. Students also have the opportunity to consider values and ethical issues associated with the applications of nuclear physics.	Problem-solving and mathematical skills are assessed through two in-class examinations and an in-class final examination. Laboratory and scientific writing skills are assessed through laboratory reports. Independent study and communication skills are assessed through a research project and oral presentation. A small class size of 15 students better enables the individual assessment of the understanding of scientific concepts and appreciation of related issues throughout the duration of the course based on in-class discussions. The small class size allows all students to profit from the capstone experience, irregardless of whether they are using this course to officially fulfill their capstone requirement.
2. Exercise critical thinking in the context of the specific discipline(s).	This course enables students to apply their critical thinking skills by analyzing physical	Logical analysis and conceptual understanding will be assessed through in-class discussions, as

	connections and using mathematical skills to model physical systems whose underlying mechanisms rely upon quantum mechanics or Relativity.	well as an oral presentation of a research project. The application of critical thinking for quantitative analysis will be assessed through in-class examinations.
<b>General Education Learning Contribution</b>		
3. Develop and use, by oneself or within a group and within or across disciplines, the inquiry, evaluative and analytical skills needed for productive academic work.	The laboratory component of this course will enable students to work in teams to gather and interpret data and draw logical conclusions. They will individually write technical reports which have components that involve inquiry, logical evaluation and analysis.	The instructor will grade these laboratory reports in order to monitor the progress of the students each week.
4. Demonstrate understanding of ethics and diverse perspectives in personal, professional, civic and cultural/global domains and apply these values. ----- 5. Develop and use the communication skills needed for productive academic work.	Students will consider the ethical issues and weigh the risks related to the applications of nuclear physics, such as nuclear energy.  Students will discuss various topics related to quantum mechanics and Relativity in class. They will give an oral presentation based on a research project. Given the counter-intuitive nature of both quantum mechanics and Relativity, any discussion of these topics requires students to communicate in an extremely clear manner.	The instructor will prompt in-class discussion. A small class of 15 students will allow for individual viewpoints to be discussed.  Communication skills will be assessed by in-class discussions as well as oral presentations based on a research topic having to do with quantum mechanics or Relativity and chosen by the instructor. A small class size of 15 students enables all students to contribute to the discussions and give oral presentations.

Example of how students could demonstrate skills, values and knowledge beyond the introductory level:

- a. Students present and synthesize information and compare and critically discuss different scholarly perspectives on a given topic.

Example of how students could exercise critical thinking in the context of the specific discipline:

- a. Students gather, interpret, evaluate and apply information from a variety of sources, and make meaningful and multiple connections.
- b. Students use creativity to solve problems. They may employ scientific reasoning and logical thinking.

Please describe in detail the communication component of the course in the table above.

### **Discipline Specific Learning**

An associate capstone course will have one or more prerequisites within the discipline. If it is an interdisciplinary course, it could have a prerequisite in a relevant discipline.

### **Independent Study**

For independent study courses taken to fulfill the capstone requirement, attach a copy of the Independent Study Application and explain how and to what an extent the course makes the contributions to student learning outlined in the table above .

**Please attach a copy of the Course Outline with this application form**