

Enhance the curriculum so that the IC Physics Department is a first rank liberal arts department with a unique experiential style. (*Turn up the heat.*)

High Priority, multi-year tasks

Establish performance-based physics for all intro courses.

This is one of the major priorities of the Physics Department over the next five years. Its experiential style is in line with the mission of the college as a whole and its establishment will bring Ithaca College to the forefront in modern physics pedagogy.

Update: The department recently organized and participated in a [SCALE-UP](#) Implementor's workshop directed by Bob Beichner. Rogers and Keller are in the process of submitting a NSF DUE CCLI A&I proposal to implement SCALE-UP at Ithaca College.

Establish a BS degree.

We intend to add a Bachelor of Science (BS) degree in physics to our existing curriculum for those students who are on a track towards graduate study. In the U.S. the BS degree in physics is often regarded as a more prestigious degree than the BA and so the BS option is a valuable recruiting tool. It also works to the students favor after graduation.

High Priority, 2004-2005 tasks

Activate teaching and department assessment methods.

Assessment of our impact on student learning has been largely anecdotal in the past. We propose to establish methods of assessment which have grown out of physics education research. We will also begin to keep careful records of the flow of majors and alumni for assessment purposes.

Update: We are currently using the FCI, CSEM, MPEX, graded class assignments, exams, and end of course questionnaires.

Reconsider and redesign the intro lab courses 119, 120, 225.

The current Ph119 course has outlived its reason for being and needs to be modified. Several alternative syllabi are being considered.

Balance the fall and spring course distribution.

At present we offer more credit hours of courses in the spring than we do in the fall which, at times, makes staffing difficult. We need to reconsider the semester that some of the courses are offered in order to balance the teaching loads.

Secondary Priority, multi-year tasks, revisit in 2005

Establish student portfolios.

The physics portfolio is a collection of documents put together and maintained by the student to demonstrate their growth and competence in physics. The portfolio will then be used by the faculty to assess the general progress of the student and for writing recommendations and by the student to apply for jobs and/or graduate school. This idea needs refinement. The first task is to further define the proposal and timeline.

Establish workbooks for some required skills.

Physics is a hierarchical discipline. It requires students to walk before they run and run before they fly especially for the first three years of study. In addition to conceptual understanding and problem solving ability there are numerous skills that are required of a competent physics student. These are normally picked up through various courses. We propose to create workbooks for these skills that will be used at the appropriate time in a course. Use of workbooks ensures faculty that students have studied a particular skill and allows students to easily review a skill when encountered again. The timeline for this work begins with a further refinement of the concept, and then proceeds with the identification and writing of the workbooks.

Secondary priority, 2005-2006 tasks

Ensure sufficient opportunities for all students who are interested in research.

At present we have been able to accommodate all students who have expressed an interest in physics research. We need to ensure that that continues when we have many more majors in the department.

Update: We currently have 14 students involved in research during the Fall 2004 Semester, and we had 7 students funded to conduct summer research during Summer 2004.

Have advanced students act as Laboratory assistants in 101, 102.

It is well known by faculty that they learn material at a much deeper level when required to teach it. By acting as laboratory assistants and tutors, our majors will grow in their understanding by having to explain concepts to others.

Update: Luke Keller is running a tutor center for PH101 and PH102 that is staffed by 3 advanced physics students. We plan on

expanding this program next year to include other introductory courses.

Tertiary priority, post 2006 tasks - revisit in 2005

Establish a course in Advanced Topics as a capstone experience for majors

This course is needed to round out our offerings in traditional physics and will be a senior level course. Its content will depend on the interests of the students. Possible topics include atomic physics, solid state physics, geophysics and nuclear physics. This will also serve as a capstone course. A course similar to this was part of the MAT proposal offered by the sciences. This course may need to be developed for the 2005-2006 academic year.

Standardize course evaluations.

Course evaluation forms in the department have been constructed by the individual faculty member. There is need for a form with standard questions to which can be added questions for individual courses.

Standardize the credit structure of intro courses 117, 118, 217, 218.

The course credit for students is not consistent for these courses. An effort will be made to standardize.

Maintain or reestablish Gen Ed service to the college with laboratory components.

Staffing problems have prevented us from offering some of our gen-ed courses and, in particular, gen-ed laboratories. These are important experiences for non-majors. The hiring of our 6th permanent faculty member will help but probably not allow a complete solution.

Establish a course in Optics.

This will be a senior level course that is in the field of study of one of our faculty members (Luke) and will be a required course for the BS degree.

Establish a course in Astrophysics.

A pilot course in Astrophysics was offered a few years ago. With an increasing number of physics majors, it is anticipated that it could become a permanent offering. Several faculty members have astrophysics as their area of expertise.

Reconsider the Math/CS requirements of our major.

Physics relies heavily on mathematics. Most physics majors obtain a math minor since it only requires a few additional courses beyond those required by our major. A review of the content of the required math courses has not been done since a major revision of the mathematics curriculum was done several years ago. We need to bring our expectations into line with the current math curriculum.