

Requests on physics graduate course offerings and requirements

Columbia Physics Graduate Council

July 16, 2020

Following discussions on the matter for about a year now in meetings with the chair, the graduate committee and in the Nevis retreat, the PGC has written a summary below to consolidate our requests.

1. Make field-specific course requirements more flexible

Currently, **students have to choose two courses** out of: Astrophysics I, Astrophysics II, Particle Physics, Condensed Matter I, Condensed Matter II, Quantum Field Theory I. That means that students interested in certain areas such as biophysics and atomic physics, among other areas, are supposed to choose between courses in unrelated fields to fulfill their requirements, when there are graduate course offerings in other departments that can be more relevant to them.

As **examples**, an AMO student might be more interested in taking an optics course in applied physics, theorists might want to take QFT II or III instead of another course more targeted towards experimentalists, a biophysicist could get more out of a biology course to fill in knowledge gaps from undergrad, an experimental particle physicist might want to take a computer science course, an astrophysicist who is not interested in high energy astrophysics might want to take a course in the astronomy department that is conflicting with astro II and more relevant to their research.

Another issue is that **certain courses are not offered for two years in a row**, which was almost the case for Particle Physics and Condensed Matter II if students had not complained about it in time before completing their second years this past semester (Spring 2020). This forces students to take courses completely irrelevant to them when they could easily find courses in other departments more meaningful and fulfilling to their education.

We still want students to have the **option of taking courses outside of their field** and count them towards their two field-specific courses, especially because students might switch labs or just not find a course in their area of interest. **However, we would like the department to offer more flexibility in choosing these two courses among 6000-level courses in physics in other departments.** In order to do that, **we suggest creation of an approval form** that could be signed by the student's advisor and the Director of Graduate Students so the student can keep it as formal proof that their selection will count towards their field-specific course requirement.

2. Students want certain courses to be offered more frequently

Scientific Computing: seems like it will be offered in the Fall of 2020, after complaints from students, but it had not been offered for several years prior. Now that Professor Mawhinney is taking over the position of Dean of Science, we expect that he won't be able to teach the course very often, so we would like the department to find an alternative solution for that, potentially finding a second professor who would be willing to teach a similar course.

General Relativity: it's a course very rarely offered, and theorists in particular have been asking that it be offered more frequently.

String theory: the department currently has a string theory course for undergraduates and no option at all for graduate students, despite the fact that it really is more of a graduate than an undergraduate topic. Theorists are typically forced to make the track all the way to NYU to take a course on string theory, and we would like the department to offer a course on it on our campus.