ML Introduction Courses Comparison

The machine learning department offers four different “Introduction to Machine Learning” courses: 10-401, 10-601, 10-701, and 10-715. All four courses have a similar goal: to introduce students to the theory and practice of machine learning. That is, students who take these courses will be able to

- select and apply appropriate machine learning algorithms for a given learning problem
- modify existing learning algorithms to apply to novel situations, and implement the modified algorithms
- read and understand research papers about machine learning algorithms

But, the courses differ in their assumed background, their relative emphasis on these goals, and their pace. This page is intended to help students choose which course is right for them.

10-715: this course is intended for PhD students in the Machine Learning Department. It is the fastest-paced and most mathematical of the courses. In addition to the goals listed above, 10-715 is intended to prepare students to write research papers that rely on and contribute to machine learning. PhD students from closely-related departments (such as CSD or RI) might consider this course if their research depends strongly on and contributes to machine learning. MS students in MLD have the option of taking 10-715 or 10-701. It will only rarely be appropriate for undergrad students or MS students outside of MLD to take 10-715.

10-701: this course is intended for PhD students with a strong mathematical and programming background. It is typically the appropriate course for PhD students in SCS departments other than machine learning, or for MS students in MLD. Students from outside SCS, or undergrads or other MS students, could consider 10-701 if they have an appropriately strong background in math and programming, including linear algebra, probability, and matrix calculus. To gain the required background, students may take 10-601 then 10-701, although they will see a substantial amount of repeated material in this case. Most other machine learning courses require 10-701 as a prerequisite; 10-715 satisfies these prerequisites as well.

10-601: students in this course have the most diverse collection of backgrounds. The most typical student is an MS student from SCS; but the course is intended to allow students from anywhere in the university, including those whose mathematical backgrounds may be rusty or incomplete, to catch up and do well. However, the course is mathematically rigorous and contains both programming and derivations in its homeworks, so students should expect to do extra work in proportion to the amount of background that they are missing.

Students can access a self-test to help choose between 601 and 701:

https://qna-app.appspot.com/view.html?aglZfnFuYS1hcHBvQGQsSDFF1ZXR0aW9uTGJzdBiAglCgpO-KCgw
When taking this test, please note that these are problems that 10-701 students should be able to solve with little effort; if you need to spend a significant amount of time on any of them, 10-601 is the more appropriate course.

10-401: this course is intended for undergraduates with a strong computer science and mathematical background. It places a greater emphasis on applications and case studies than the other courses, but nonetheless gives students an introduction to the theory and mathematics of machine learning. Unlike 10-601, the course is not paced to allow students with incomplete backgrounds to catch up; however, students who do well in the prerequisite and co-requisite courses will have sufficient background to do well in 10-401.