Massachusetts Institute of Technology
Department of Electrical Engineering and Computer Science
6.s080 Introduction to Inference
Spring 2014

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# FREQUENTLY ASKED QUESTIONS

There has been a lot of interest in this new subject since its official announcement, and as a result many questions. Here are answers to some of the most frequently asked ones. We'll aim to keep this list up to date.

1. **What is 6.s080 about, why is it important, and who should take it?**

   We live in a world in which we constantly need to extract information from data. This is the central problem of inference. And computational efficient methods for such inference are enabling technologies for an enormous range of applications.

   Example domains abound, and include machine learning, search and retrieval, data mining, computer vision and imaging, voice recognition, communication and compression, natural language processing, robotics and navigation, computational biology and bioinformatics, medical diagnosis, distributed sensing and monitoring, and finance.

   Many of the most successful inference algorithms arise out of probabilistic modeling and analysis. If you want to learn the fundamentals of this discipline and what you can do with it, this subject is the place to start. Indeed, it will provide a solid foundation for more advanced subjects that build on this framework of reasoning.

2. **What departmental requirements does 6.s080 satisfy?**

   Students in 6-2 program may select 6.s080 as one of their EE or CS foundation subjects. All EECS students may select 6.s080 as one of their math elective or free elective subjects.

3. **I am in 6-2 program. Could I select 6.s080, 6.004, 6.005, and 6.006 as my foundation subjects?**

   Yes, this is likely to be a popular 6-2 foundation subject combination.

4. **What if I am committed to 6-1 or 6-3? Can I get credit for 6.s080?**

   In this case you can certainly get credit for 6.s080 as a math elective or free elective. You just can't use it to satisfy your foundation requirement.

5. **I am 6-3, the degree requirements state that I must select 6.042 as one of my math electives. I also noticed that several subjects require 6.042 as a prerequisite. 6.s080 website states that I can petition to take 6.s080 instead of 6.042. What is the purpose of the petition?**

   We believe that 6.s080 will serve as an adequate prerequisite for subjects that require 6.042, with one exception: 6.042 introduces students to the concept of precise formal proofs and helps them build skills for constructing proofs. While 6.s080 is a mathematically rigorous subject, proofs are not explicitly part of its syllabus. As part of your petition, you will need to convince us that you either already have had sufficient exposure to proofs (by telling us where you learned about the concept and how rigorous your training was) or that you are committed to and capable of learning the

concept on your own before you take more advanced subjects that require 6.042 as a prerequisite. Note that the subsequent subjects will make no allowances for students who took 6.s080 instead of 6.042 and will assume that all students are familiar with proofs. If you have questions about this, or are unsure if your background in proofs is adequate, we will be happy to meet and help you understand if this is the right path for you. Please don't hesitate to contact us! Please also note that you must file the petition and get it approved **before the add date in Spring 2014**.

6. **Most of our foundation subjects lead to more advanced subjects in the curriculum. Is this the case for 6.s080?**

   Indeed, it is. A new header-level course 6.036 Introduction to Machine Learning was introduced in Spring 2013 and can serve as a CS header subject instead of 6.034. It provides a bridge between 6.s080 and more advanced subjects in inference and machine learning, including 6.437, 6.438, and 6.867. The final structure of the subject sequence is being currently discussed in the department is will be likely finalized in the next year.

7. **I am 6-2, I'd like to take 6.s080, 6.004, 6.005, and 6.006 as my foundation subjects. After that I will need to take 3 header subjects, at least one of which must be an acceptable EE header. What are possible headers that can serve this purpose for students like me?**

   6.036 Introduction to Machine Learning can be used as a CS header instead of 6.034, and is likely to be a popular choice. Students who use 6.036 as a header could use some of our key advanced inference and machine learning subjects like 6.437 Inference and Information, 6.438 Algorithms for Inference, and 6.867 Machine Learning as AUS subjects.

8. **I am not in Course 6. Can I take this subject?**

   Of course! This subject is for anyone at MIT who wants an introduction to the fundamentals of inference.

9. **Will 6.s080 have labs like some of the other foundation subjects?**

   No, the subject will not have traditional labs. It will be problem set based. However, computational aspects of inference are an important aspect of the subject, and thus problem sets will consist of a combination of analytical and computational exercises to reinforce the material from class.

10. **With my schedule, I am not sure if I will be able to take this offering of 6.s080. On what schedule will this subject be offered in future years?**

    The plan is to offer the subject once per year for the next couple of years while it gets up to speed. In the longer term, we anticipate the course being offered each term.

11. **I have not taken the official prerequisite 6.01, but I notice that students without this subject can take 6.s080 with permission of the instructors. What kind of background is expected?**

We will assume that students in the class have had at least a brief introduction to probability and random variables in a prior subject. For example, 6.01 provides a roughly two-week introduction to such material. And thus this will be our starting point. In the first week of classes we will hand out a brief diagnostic problem set that will help remind students what we want them to remember from 6.01 if they took it, or otherwise help students assess their background for 6.s080.

12. **I have always dreamed MIT would offer such a subject, but never thought it would happen in my time. It sounds too good to be true. Is it really going to be as good as it seems?**

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13. **I have additional questions about 6.s080. Is there someone I can contact?**

    Of course, feel free to send email to Polina Golland at polina@mit.edu !