

# Foundations of Machine Learning (CS725)

Instructor: Saketh

## 1 Goals, Scope and Syllabus

This is an introductory course on Machine Learning. Though this course is for beginners, knowledge of probability theory and statistics is very essential. Additionally, it will be helpful if the student is familiar with basic engg. maths including Linear Algebra, Multi-variate Calculus and Optimization theory.

This course, though introductory, focuses on foundations and fundamentals rather than giving a bird's eye-view. Hence the development is technical with enough motivation provided wherever necessary.

The syllabus is as displayed on asc and there are mainly three textbooks for this course:

- Foundations of Machine Learning by M. Mohri, A. Rostamizadeh, and A. Tahwalkar. Published by MIT Press, 2012. This will mainly be used for Kernel methods related topics.
- Machine Learning: A Probabilistic Perspective by Kevin Murphy. Published by MIT Press 2012. This will mainly be used for topics related to probabilistic models.
- The elements of statistical learning: data mining, inference and prediction by Trevor Hastie, Robert Tibshirani, and Jerome Friedman. Published by Springer, 2nd edition, 2009. Here will refer this while talking about some classical concepts and algorithms.

After crediting this course the student should be capable of pursuing research problems in the field of machine learning or its applications. He will be familiar with some well-celebrated and basic models/algorithms for learning.

## 2 Evaluation Scheme

The final grade will be an “average” for those obtained in Midsem and Endsem, both of which might be fill-in-the-blank type exams. Performance in assignments, bonus questions, quiz-1, quiz-2 etc. may be used to promote/demote the final grade.

### 3 Contact

The course page is at <http://www.cse.iitb.ac.in/saketh/teaching/cs725.html>. Instructor's office: No. 306, Kanwal Rekhi Building. The instructor can also be contacted via phone: x7903 or email: saketh at cse anytime or using moodle interface. All communications to the students will be sent through moddle. All lecture and assignment material will be posted on course page.