

课程大纲 COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	机器学习 Machine Learning
2.	课程性质 Compulsory/Elective	必修课 Compulsory
3.	开课单位 Offering Dept.	统计与数据科学系 Dept of Statistics and Data Science
4.	课程学分/学时 Course Credit/Hours	3/48
5.	授课语言 Teaching Language	英文 English
6.	授课教师 Instructor(s)	荆炳义 Bing-Yi JING
7.	开课学期 Semester	春季 Spring Semester
8.	是否面向本科生开放 Open to undergraduates or not	否 No
9.	先修要求 Pre-requisites	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)

10. 教学目标 **Course Objectives**

(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)

Machine learning aims to build computer systems that learn from experience. It is a fast-developing and interdisciplinary field, with historical roots in computer science, statistics, pattern recognition, neuroscience and physics. Many approaches in machine learning have led to rapid theoretical advances and real-world applications.

This course attempts to bring together many of the important ideas and algorithms in machine learning, and explain them in a systematic and unified framework. It covers topics in regression, classification, mixture models, neural networks, deep learning, ensemble methods and reinforcement learning.

11. 教学方法 **Teaching Methods**

(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)

课程, 作业, 项目 Classes, Homework, Projects

12. 教学内容 **Course Contents**

(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)

Section 1	Introduction to Machine Learning
Section 2	Linear Models for Regression & Classification

Section 3	Nonlinear Models for Regression & Classification
Section 4	Kernel methods
Section 5	Model Assessment and Selection
Section 6	Graphical Models & Network Data
Section 7	Variational Inference
Section 8	Neural Networks and Deep Learning
Section 9	Neural Networks for Computer Vision & NLP
Section 10	Reinforcement Learning

**13. 课程考核
Course Assessment**

(○1考核形式Form of examination; ○2.分数构成grading policy; ○3如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)

作业: 20%, 项目: 40%, 考试: 40%

Homework: 20%, Projects: 40%, Exam: 40%

**14. 教材及其它参考资料
Textbook and Supplementary Readings**

教材及其它参考资料
Textbook and Supplementary Readings

1. Christopher M. Bishop. *Pattern Recognition and Machine Learning*
2. Ian Goodfellow, Yoshua Bengio, Aaron Courville. *Deep Learning*
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman. *Elements of Statistical Learning*.
4. Sabastine Raschka and Vahid Miralili. *Python Machine Learning*.
5. Daniel Jurafsky and James H. Martin. *Speech and Language Processing*