# 機率（Probability）

- Time: Thur 14:20-17:20pm
- Course website: https://www.csie.ntu.edu.tw/~sdlin/Courses/probability20.htm
- Course Room: CSIE-R104
- Instructor: Prof. Shou-de Lin (林守德), sdlin@csie.ntu.edu.tw
- Office: CSIE 333
- Office hour: after class or by appointment
- TA: 張立暐 r08922041@ntu.edu.tw ,
  廖其忻 r08922148@ntu.edu.tw ,

# About the Instructor

- Shou-de Lin (林守德) 教授 (現職Appier首席機器學習科學家)
  - 台大電機系學士
  - 密西根安娜堡大學電機碩士
  - 南加州大學計算語言學碩士
  - 南加州大學資訊科學博士
  - 美國羅沙拉摩斯國家實驗室博士後研究員
- LAB：機器發明與社群網路探勘實驗室 (MSLAB)
- 課程：
  - 機率
  - 機器學習專論
  - 機器學習理論與實務
  - 社群網路分析
  - 統計人工智慧
  - 科技英文寫作與研究方法
  - 機器發明

# About this Course

- It is a required course for NTU CSIE students.
- There are two sections.
- Our section will be taught in Chinese, but the slides will be in English.
- Our section aims at not only teaching the fundamental concept of probability theory, but also how in practice it can be applied to solve engineering problems.
- It is rather an application-oriented curriculum than a theoretical one.
- Adding into this class is possible (up to 106 persons).

# Remote Teaching Materials

- In March, we will use remote lectures
  - Links to video files will be downloadable from Ceiba before the class starts
  - Questions please use Ceiba discussion board, and I'll reply to them directly.

# For Addition

- If you want to drop this class, please do it ASAP so we can add others.
- To add, please send email to our TA in 48 hours r08922041@ntu.edu.tw
  - Title: Adding to Probability20 course
  - Content: please describe your department and year (e.g. 資工系二年級），
  - Priority: all NTU CSIE students will be accepted , then based on seniority
- You will be sent the registration code if approved.

# Textbook and References

- Textbook： R.V. Hogg and E. A. Tanis, *Probability and Statistical Inference*, 8th or 9th ed., Prentice Hall.（華泰）
- Reference books:
  - Probability for Electrical and Computer Engineers, Charles Therrien, Murali Tummala
  - Probability and Statistics for Engineering and Science, Jay Devore
  - Probability and Statistics for Computer Science, James L. Johnson

# Grading

- Midterm 1: (35%)
- Final: (35%)
- Final Project: (30%)
  - Finding (or be assigned) an interesting topic to solve that's relevant to probability
  - Each team contains 3 persons
  - More to come later
- (if it turns out that in-person presentation is too risky due to Corona virus, we will cancel the project and turn to midterm 50% + final 50%)

# Syllabus

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|---|---|
| 3月5日 | Introduction |
| 3月12日 | Axiom_prob, Conditional Prob, Independence, Baye's Rule |
| 3月19日 | Random variables, mean and variance |
| 3月26日 | discrete prob distribution |
| 4月2日 | no class |
| 4月9日 | Continuous Probability Distribution, Normal Distribution |
| 4月16日 | Multivariable distributions |
| 4月23日 | Midterm |
| 4月30日 | Conditional distributions, correlation, independency, distribution of functions |
| 5月7日 | Chebyshev's inequality, Central Limit Theorem, Law of large number |
| 5月14日 | estimation, chi-square |
| 5月21日 | Confidence Interval + Hypothesis Test |
| 5月28日 | Information Theory |
| 6月4日 | Language models & others, Probability & Life |
| 6月11日 | Final Exam |
| 6月18日 | Final Project Presentation/Demo |