



# 114年度第二學期 電機系 四電機2A

## 信號與系統 (*Signals and Systems*)

**Instructor: Dr. Day-Fan Shen (沈岱範)**  
**Department of Electrical Engineering**

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- 2A – 星期二上午 BCD (9am-12pm)
- 教室: 工程五館 EB106
- 助教: 陳杰為, 郭政賢 (碩士研究生)
- 主動課輔TA: 未定
  
- 助教實驗室: EN308 (工程六館三樓)
- Tel: ext. 4299

## Textbooks

1. A. Oppenheim, A. Willsky, and H. Nawab, Ding, *Signals and Systems*, 2<sup>nd</sup> adapted edition, 2016, Pearson, 歐亞書局代理

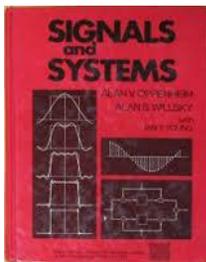
### Reference Books:

1. M.J. Roberts, *Fundamentals of Signals and Systems*, McGraw Hill International Edition, 2008, 滄海圖書代理
2. J.H. McClellan, R.W. Schafer, & M.Y. Yoder, *Signal Processing First*, Pearson Education International, 2003, 開發圖書代理,

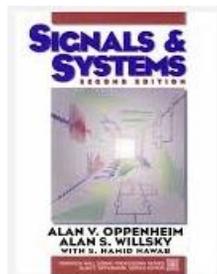
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## About the textbook

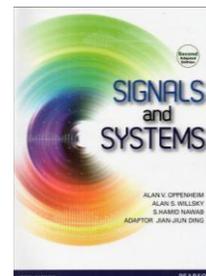
- 「**訊號與系統**」是電子電機及其他相關科系的專業課程，是所有訊號處理與系統分析相關課程和研究的基礎。
- Oppenheim等人所著的Signals & Systems 一書內容兼具廣度和深度，可說是訊號與系統的經典著作之一。



第一版



第二版



加強第二版

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## Grading

- Homework & Quiz: **20%**
- Midterm Examination: **40%**
- Final Examination: **40%**
- 出席率與上課發問: **+/- 10%**

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## Prerequisite

- **Math:**
  - Calculus, Matrix, Vectors, Complex numbers
- **English:**
  - Reading: vocabularies and **grammar**
  - Listening: 需熟悉英文專有名詞
- **Motivation**
  - Goal and attitude
- **Self-confidence**

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## Following Courses

- DSP (digital signal processing)
- Linear systems
- Communication systems
- Control systems
- .....
- *Any courses require knowledge of **Fourier transform/analysis** (frequency-domain analysis)*

## Contents

- **Chap 1. Signals and Systems**
- **Chap 2. Linear Time-invariant Systems**
- **Chap 3. Fourier Series for Periodic Signals**
- **Chap 4. Continuous-Time Fourier Transform**
- **Chap 5. Discrete-Time Fourier Transform**
- ~~**Chap 6. Time and Frequency Characterization**~~
- **Chap 7. Sampling (From analog to digital)**

# Signals

- Continuous-time (CT) & discrete-time (DT)
- Real & complex
- Sinusoidal, exponential, complex exponential
- Periodic & aperiodic
- Fourier series analysis & Fourier transform

# Systems

- Memory & memoryless,
- Casual & non-casual,
- Stable & non-stable,
- Linear & nonlinear,
- Time variant & invariant
- Linear time-invariant (LTI) & linear time-variant (LTV)

# CT & DT Signals

- Periodic signals:
  - Fourier series representation
  - Fourier transform
- Aperiodic signals:
  - Fourier transform
  - *no* Fourier series representation