

# **Circuits and Electronics I**

## **(108 (spring) 電路與電子學一 邱瀟德教授**

### **(3 units) (Undergraduate students)**

#### 一、課程說明(Course Description)

This course is intended for undergraduates in the computer science and other engineering department. In this course, we focus on two main topics, electronics and circuits. To give students better understanding of the models and circuits of the electronics devices, we will introduce the basic concepts of electric circuits first. It starts from the definition of current, voltage, power and energy. Then it covers the basic circuit components including resistor, capacitor, and inductor. We also discuss the basic circuit analysis, such as nodal analysis of resistive circuits, transients in electrical circuits and sinusoidal steady-state circuit behavior.

For electronics section, we will present the diode and MOS field-effect transistor. We will use simple models to describe these electronic devices and their I-V characteristics. Since the majority of electronic circuits today are designed as integrated circuits (ICs), we will discuss how to analyze and design the basic elements of integrated circuits with the emphasis on digital logic designs.

#### 二、指定用書(Text Books)

##### Part I: Circuits

"Electrical Engineering, Principles and Applications", by Allan R. Hambley, fourth edition, (ISBN: 0-13-206692-0), Pearson, Prentice Hall.

##### Part II" Electronics

"Electronic Circuit analysis and Design", by Donald A. Neamen, (ISBN:007-125443-9), McGraw Hill.

#### 三、參考書籍(References)

#### 四、教學方式(Teaching Method)

Lecture and discussion.

#### 五、教學進度(Syllabus)

Part I:

- **CH1 Introduction**
- **CH2 Resistive Circuit**
- **CH3 Capacitor and Inductor**
- **CH4 Transient**
- **CH5 Steady State Sinusoidal Analysis**
- **CH6 Frequency Response**

Part II:

- Ch 1: Semiconductor materials
- Ch2: Diode
- Ch3: MOS field-effect transistor
- Ch4: Basic MOSFET Amplifiers

simple models to describe these electronic devices

I-V characteristics

analyze and design the basic elements of integrated circuits

with the emphasis on digital logic designs

六、成績考核(Evaluation)

HW: 20%

In-class participation : 5%

Exam I: (25%)

Exam II: (25%)

Exam III: (25%)

七、可連結之網頁位址

<https://eeclass.nthu.edu.tw>