ELG2136: Electronics I
(Winter 2012)

Riadh W. Y. Habash
School of Electrical Engineering and Computer Science
University of Ottawa
Ottawa, Ontario, Canada.

Content

Textbook: Microelectronic Circuits-Sedra/Smith; Oxford University Press, 2010.

Physics of semiconductors. **Diodes**: operation, models. and application circuits. **Biopolar Junction Transistors** - operation and characteristics. DC and AC circuit models. Basic single-stage BJT amplifier configurations. **Field-Effect Transistors**: Structure and physical operation, bias circuits, small-signal equivalent circuits and basic amplifiers. Basic concepts of digital logic circuits. The BJT inverter. **The CMOS Inverter**. Propagation delay of the CMOS inverter. CMOS gates and other digital circuits. Introduction to Semiconductor **Power Electronics Devices**: thyristor, triac, Insulated Gate Bipolar transistor. Power Electronics Applications: The AC-DC, DC-DC, and DC-AC converters.

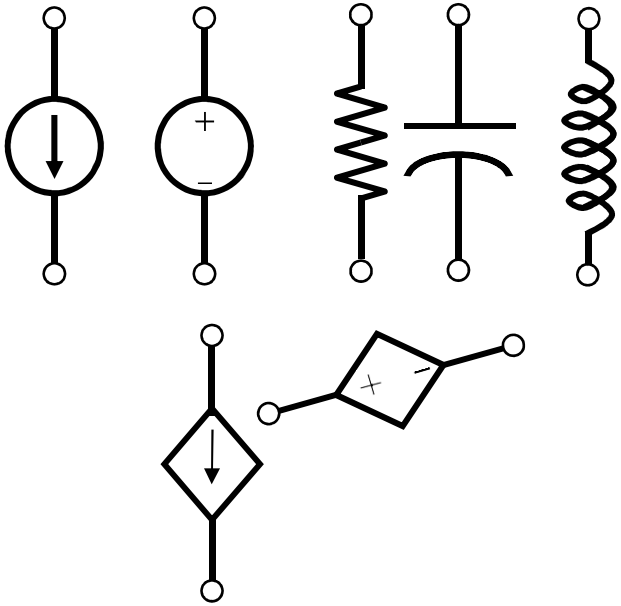
- Chapters 3: Semiconductors
- Chapter 4: Diodes
- Chapter 6: Bipolar Junction Transistors
- Chapter 5: Field-Effect Transistors
- Chapter 13: MOS Digital Circuits
- Other Sources: Introduction to Power Electronics

ELG2316 Agenda

- Duration: 14-week lecture/lab (Semester II)
- Directed Study: 22 lectures
- Individual Study Time: 78 hours
- Mid-term Tests (2): Each 10%
  - Time: to be fixed.
  - Date: to be fixed.
  - Venue: to be fixed.
- Final Exam: 40%:
  - Time: to be fixed.
  - Date: to be fixed.
  - Venue: to be fixed.
- Lab/Project: 30%.
- Assignment and Quizzes: 10%.

ELG 2138 Versus ELG2136

ELG 2130



Linear Devices

ELG 2136

Chapter 2

Operational Amplifier

Chapter 3

Diode

Chapter 4

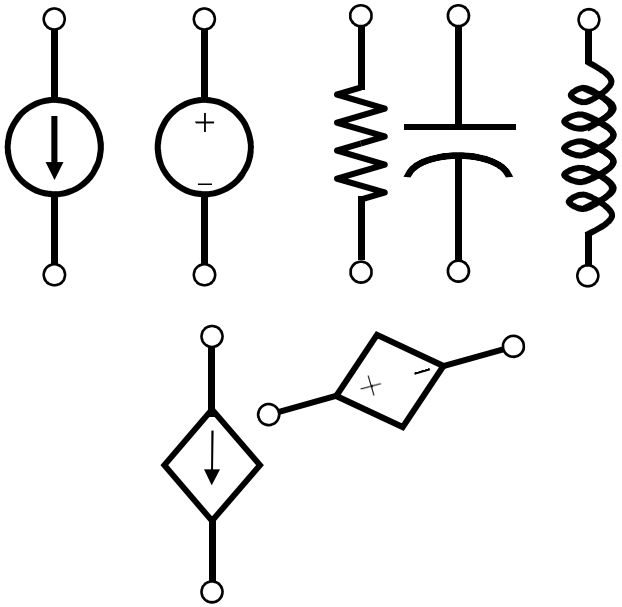
Bipolar Transistor

Chapter 5

Field-Effect Transistors

ELG 2138 Versus ELG2136

ELG 2138

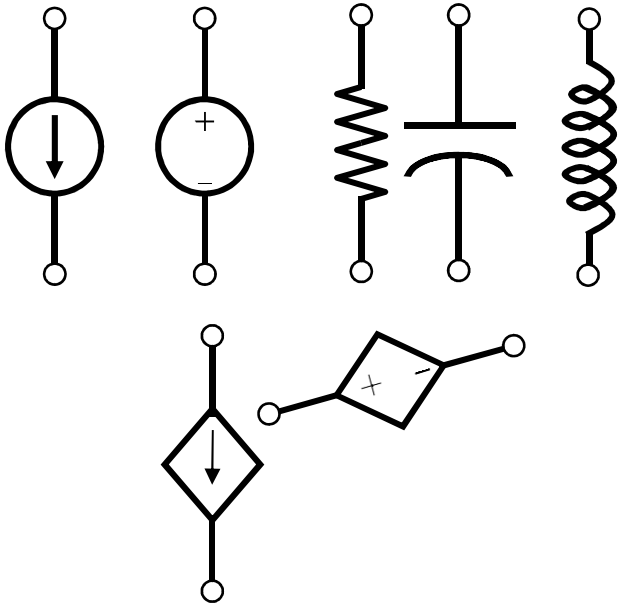


Is a tool box!
Can only be used to build filters.

Linear Devices

ELG2136

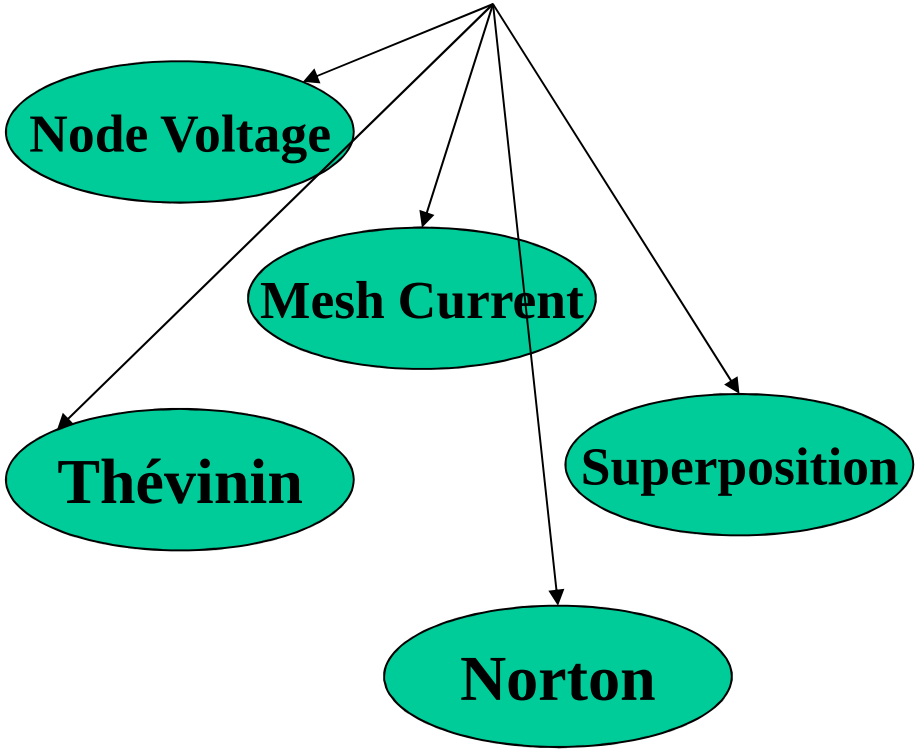
IN
ELG 2138



Linear Devices

We use KVL and KCL

We built upon them



ELG2136

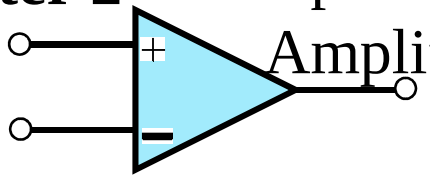
NO

We are going to use the same analysis techniques for circuits with these elements?

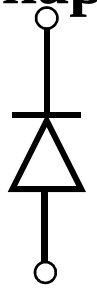
ELG 2136

Chapter 2

Operational Amplifier

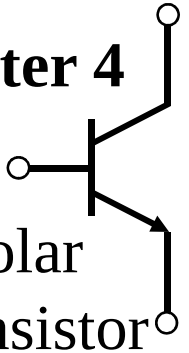


Chapter 3

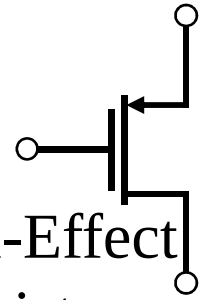


Diode

Chapter 4



Bipolar Transistor



Chapter 5

Field-Effect Transistors