

# EECE 210

## Electric Circuits

### Introduction

# Electrical Systems

- Electrical systems pervade our lives:
  - Buildings, vehicles, factories, refrigerators, mobile phones, computers, etc.
- Electrical systems classification:
  - Communication systems
  - Control systems
  - Computer systems
  - Power systems
  - Signal processing systems



Figure: 01-03

# What is an Electric Circuit?

- An actual electrical system
- A mathematical model that approximates the behavior of an actual electrical system
- An interconnection of "simple" circuit elements or devices

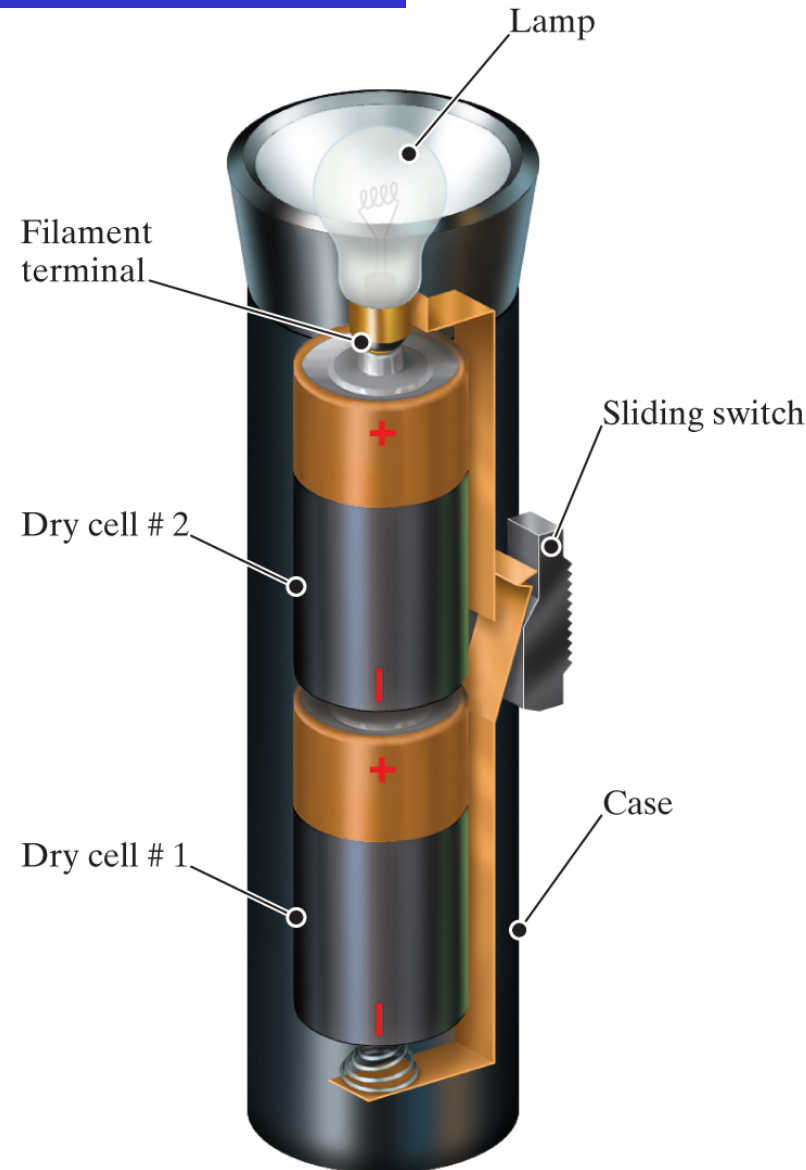


Figure: 02-11

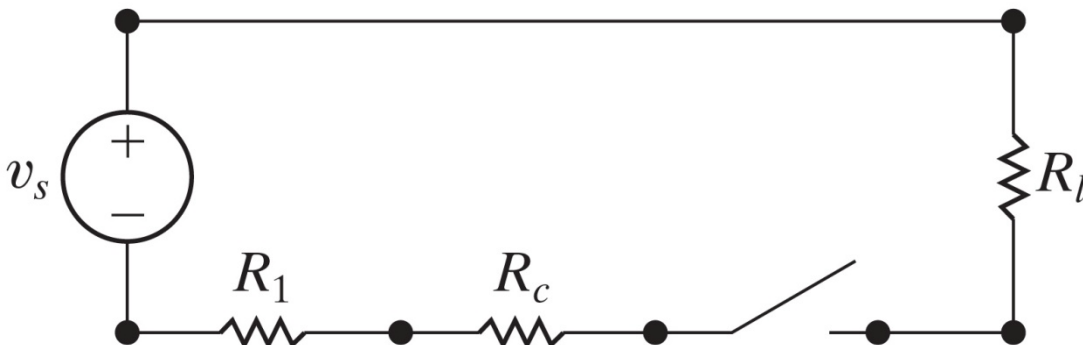


Figure: 02-12

# Circuit Analysis: An Overview

- **Circuit model:** mathematical model for electrical systems
  - Elements of a circuit model are called ideal circuit components
- **Ideal circuit component:**
  - Mathematical model of an actual electrical component (battery, bulb)
  - Represent behavior of an actual electrical component with good accuracy
- **Physical prototype:**
  - Actual electrical system, constructed from actual electrical components
  - Measurements are used to evaluate behavior of the physical system
- **Circuit analysis** is based on the variables of **voltage** and **current**

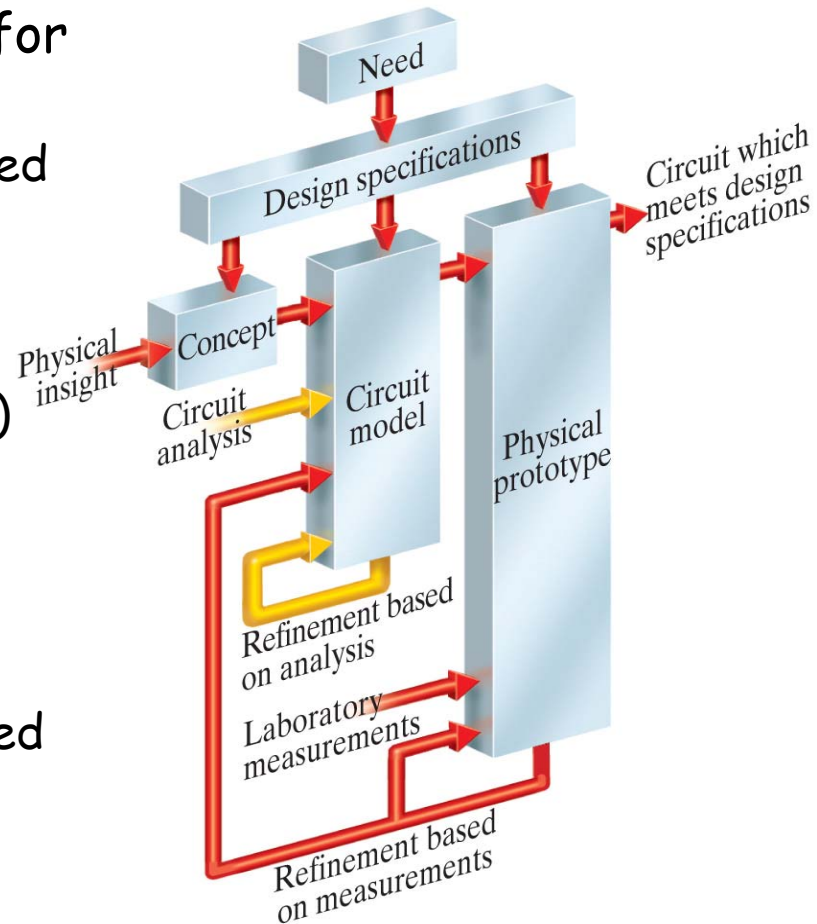


Figure: 01-04

# Course Topics

- ❑ Chapter 1: Circuit Variables
- ❑ Chapter 2: Circuit Elements
- ❑ Chapter 3: Simple Resistive Circuits
- ❑ Chapter 4: Techniques of Circuit Analysis
- ❑ Chapter 5: The Operational Amplifier
- ❑ Chapter 6: Inductors, Capacitors, and Mutual Inductance
- ❑ Chapter 7: Response of First Order RL and RC Circuits
- ❑ Chapter 8: Natural and Step Responses of RLC Circuits
- ❑ Chapter 9: Sinusoidal Steady-State Analysis
- ❑ Chapter 10: Sinusoidal Steady-State Power Calculations