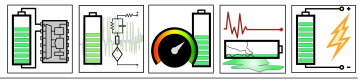
Welcome to the specialization!

- Welcome to ***Algorithms for Battery Management Systems***!
- Batteries power our modern lives

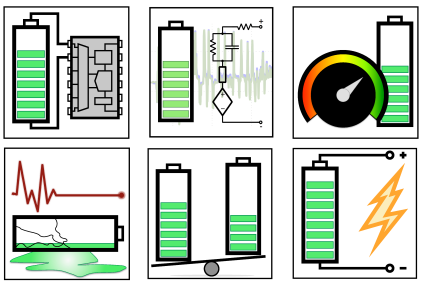
What is a battery management system?



- Batteries must be ***managed*** properly by electronics, software:
  - Protect the application user
  - Protect the battery pack itself
  - Maximize the performance (power and energy) delivered by the battery
  - Maximize the service life of the battery pack itself
- ***Algorithms*** are computer methods designed to accomplish a specific task
- ***This specialization is all about computer methods—implemented in specialized electronics—that protect the user and the battery pack, and optimize a tradeoff between performance and service life of the battery***

What do we cover in this specialization?

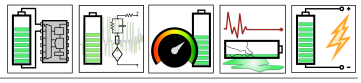
- This specialization is divided into five courses:
  - Introduction to battery management systems
  - Equivalent-circuit cell model simulation
  - Battery state-of-charge (SOC) estimation
  - Battery state-of-health (SOH) estimation
  - Battery-pack balancing and power estimation
- An honors track is available, to gain greater insights and skills

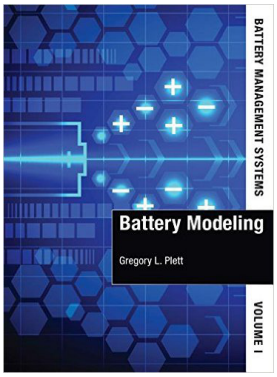


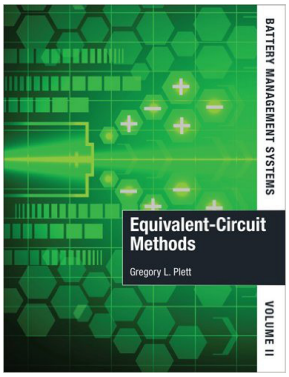
Am I a good fit for this specialization?

- You are a good fit for this specialization if you have:
  - A Bachelor's degree in Electrical, Computer, or Mechanical Engineering, or
  - A B.S. degree with undergraduate-level competency in the following areas:
    - ***Math***: Differential and integral calculus, operations with vectors and matrices (mechanics of linear algebra), and basic differential equations
    - ***Engineering***: Linear circuits (modeling resistors, capacitors, and sources)
    - ***Programming***: MATLAB, Octave, or similar scientific program environment
- There is a quiz this week testing prerequisite knowledge: If you do well on the quiz, you have the background to do well in the specialization

Is there a textbook?







- If you wish for more permanent and in-depth resources for the materials I will talk about in this specialization, two *optional* textbooks may be purchased from Artech House Publishers

Again, welcome!

- Again, I am pleased to welcome you to this specialization!
- You are going to learn valuable state-of-the-art skills in all the primary algorithm tasks required by a battery management system
- Moreover, you will be able to apply them by implementing them for different battery-application domains

Credits

Credits for photos on slide 1

- All photos are licensed [CC BY 2.0 (https://creativecommons.org/licenses/by/2.0/)]
  - Phone: By Hazma Butt, credits to site http://www.buynothingnew.org/2017/06/sole-treadmill-reviews.html
  - Electric vehicle: By Automobile Italia, https://www.flickr.com/photos/automobileitalia/16107441688
  - Windmill and grid: By Victor Semionov, https://www.flickr.com/photos/vsemionov/9466995665/in/dateposted/