

# How to Design Electric Vehicles (EVs)

## IAP 2016 Non-Credit Course

### Instructors

Sanjay Sarma, Professor of Mechanical Engineering, MIT Mechanical Engineering, MIT Director of Digital Learning  
Ryan Chin, Managing Director & Research Scientist, MIT Media Lab, City Science Initiative  
Lennon Rodgers, Research Scientist, MIT International Design Center

### Guest Instructors

Rick Chamberlain, Chief Technology Officer, Boston-Power Inc.  
Eric Carlson, Senior Fellow, Boston-Power, Inc.  
Craig Carlson, Executive Advisor, Parthenon EY

### Course Description

If you are interested in designing and building electric vehicles (EVs), then this IAP class is for you.

This hands-on course brings together industry experts, MIT faculty, staff, and students to present the basic building blocks to EVs including: battery systems, electric motors, motor controllers, and the overall vehicle systems integration. Each session will delve into practical engineering issues through interactive presentations by instructors and guest speakers. There will also be working sessions conducted by student mentors. The course will address the following questions:

- How to specify batteries, motor controllers, and motors to satisfy vehicle performance and efficiency goals
- How to integrate cooling, electrical, and communications systems that are crucial to the operation of EVs
- How to evaluate technology options
- How to make design decisions related to overall system and subsystem specification and selection

In addition to lectures, this year we will be offering three “hands-on” lab sessions in order for participants to apply lessons from the talks to practical in-class exercises that emphasize learning by doing and peer-to-peer collaboration.

The remaining sessions will focus on current market trends, cost challenges, competitive technologies, and future applications including urban mobility, EV infrastructure, energy storage for utilities, and the role of policy and incentives.

### Schedule

Lectures – 9am to 12pm on January 19, 20, 21, 26, 27, 28 in E15-341

Labs – 9am to 4pm on January 22, 25, 29 in the International Design Center (IDC) in N52, 3rd floor

**Prerequisites** – Permission of Instructor

**Attendance** – Participants welcome at individual sessions

**Sponsors** – Mechanical Engineering

**Contact** – Ryan Chin, rchin@mit.edu; Lennon Rodgers, rogers@mit.edu

**Website and Syllabus** – <http://cp.media.mit.edu/workshops/>

**Enrollment** – Advanced sign-up is required by Jan. 15th, 2016. Course enrollment is limited to 40 (lecture) and 14 (labs). Students can sign up for both lecture and lab sessions. If the course is oversubscribed, a short essay will be required for selection. Prospective students can sign up here: <http://goo.gl/forms/7LGMW16pOY>

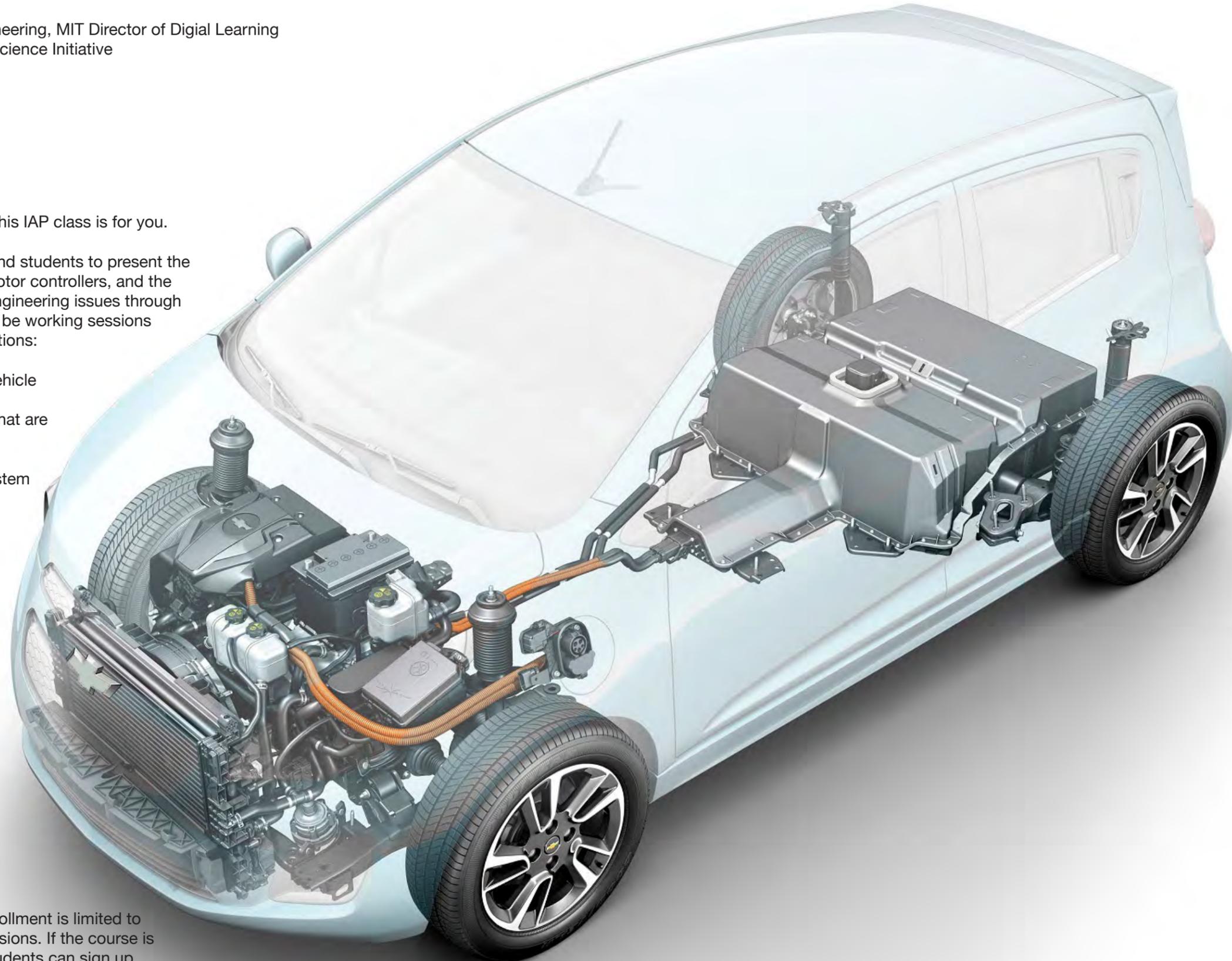


Image: GM Chevy Spark Electric Vehicle (EV) cutaway