INNOVATIONS IN PERSONAL URBAN MOBILITY

Date: TBD | Tuition: TBD | Continuing Education Units (CEUs): TBD
*This course has limited enrollment. Apply early to guarantee your spot.
Application Deadline »

Share |

Course Summary | Learning Objectives | Who Should Attend | Program Outline | Schedule |
Participants' Comments | About the Lecturers | Location | Links & Resources | Updates

STATUS PENDING New dates will be released in October. Click here to be notified.

COURSE SUMMARY

This workshop-style course will focus on the development and deployment of innovations for achieving sustainable personal mobility in cities. We will examine the latest "in-the-box" innovations in technology, designs, strategies, and policies employed by cities to increase energy efficiency, reduce carbon emissions, and improve overall access and mobility for increasingly dense and crowded urban environments. We will also explore "out-of-the-box" innovations that go beyond incremental improvements and utilize system-level integration, holistic thinking, ecosystem solutions, and cutting edge technology. Finally, this course will introduce the concept of City Science – a new discipline developed at the MIT Media Lab that leverages Big Data approaches to create an evidence-based approach for the design of urban systems like mobility, energy, live/work spaces, and food production.

The course will introduce a broad survey of the following key areas of sustainable urban mobility:

1. Vehicles – A morphology of vehicle types (buses, cars, trucks, motorcycles, bicycles, Segways) and technologies (electric, hybrids, fuel cells, biofuels, compressed natural gas, etc.) will be presented as well as the latest vehicle innovations (MIT Media Lab's CityCar concept, GM's EN-V, Autonomous Driving).

2. Urban infrastructure – Electric charging infrastructure, rapid charging stations, Vehicle-to-Grid (V2G), Smart Grids, novel energy storage, mass transit systems (i.e. Bus Rapid Transit), alternative vehicle lanes, and bike lanes.

3. Use and Economic Models – Private car ownership, shared-use systems (i.e. ZipCar, bike sharing programs), fleet operations, public transit, traditional rentals, and Mobility-on-Demand (MoD) Systems..

4. Urban Implementation – Urban design of streetscape, parking, buildings, creation of new urban policy (i.e. congestion pricing, dynamic road pricing), use of intelligent fleet management systems, integration into public transit systems, pilot testing, and deployment.

5. City Science – Big Data analytics and interconnectedness of urban systems, including the impact that planning, zoning, and public policy has on mobility mode choices.

The course will be divided into three learning methods 1) lectures by course faculty and guests from academia and industry, 2) participatory group design work in "charrette" sessions (a type of brainstorming), and 3) critique by faculty and invited experts. Using the MIT campus as a potential site for deployment, course participants will work on a series of short in-class assignments that focus on solving practical mobility problems. The goal of the workshop is for participants to engage in critical thinking about the technological, social, cultural, and economic challenges for achieving smart sustainable cities in order to return to their community, corporation, or institution to implement positive change.

The course textbook will be Reinventing the Automobile: Personal Urban Mobility for the 21st Century, MIT Press, written by (the late) MIT Professor William J. Mitchell with two automotive experts from General Motors, Christopher Borroni-Bird and Lawrence Burns.

Content

0%   100%

■ **Fundamentals:** Core concepts, understandings and tools **(20%)**

■ **Latest Developments:** Recent advances and future trends **(30%)**

■ **Industry Applications:** Linking theory and real-world **30%)**

■ **Real-World Implementation:** Design and decision making for change **(20%)**

Delivery Methods

0%   100%

■ **Lecture:** Delivery of material in a lecture format **(30%)**

■ **Discussion or Groupwork:** Participatory learning **(50%)**

■ **Labs:** Demonstrations, experiments, simulations **(20%)**

Level

0%   100%

■ **Introductory:** Appropriate for a general audience **(40%)**

■ **Specialized:** Assumes experience in practice area or field **(30%)**

■ **Advanced:** In-depth explorations at the graduate level **(30%)**

LEARNING OBJECTIVES

1. Understand the current environmental, energy, and mobility issues facing cities.

2. Build a knowledge base of the latest technologies and strategies being developed and deployed in cities and understand the benefit and cost tradeoffs for these solutions.

3. Develop new concepts and designs by participating in "charrette" sessions (a type of brainstorming in small groups) that focus on a limited set of core issues connected to a real-world implementation.

4. Evaluate the technological, design, economic, and policy implications from the charrette and discussions.

5. Develop a holistic and system-level perspective on sustainable urban mobility that takes an integrative approach towards complex problems that leverages Big Data analytics and strategies related to planning, zoning, and public policy.

WHO SHOULD ATTEND

No specialized knowledge is required; however, this course will be particularly useful for the following sectors:

- Government – innovation leaders from national, regional, and city governments
- Industry – executives, architects, urban and transportation planners, system integrators, automotive designers/engineers, product designers, and project leaders
- Academia – researchers, graduate, and undergraduate students in city planning, transportation, architecture, design, and engineering

PROGRAM OUTLINE
Day 1

- Course Introduction and Overview
- Energy, Environment, and Mobility Challenges in Cities
- City Science (introduction)
- Alternative Vehicles (HEV, EVs, Fuel Cells, Biodiesel, etc.)
- Vehicle Sharing Programs*
- Electric Charging Infrastructure and Smart Grids
- Day 1 overview
- Group dinner (after class)

Day 2

- Transportation Logistics and Fleet Management Systems
- What's Happening Now Inside the Automobile Industry*
- Big Data
- Urban Design Implications
- Charrette No.1
- Day 2 overview

Day 3

- Autonomous Driving Technologies*
- Public Policy

- New Business Models
- New Urban Systems
- Charrette No. 2
- Day 3 overview

Day 4

- Charrette No. 3
- Final Review and Critique*
- Course overview and wrap-up

*Invited academic or industry experts

COURSE SCHEDULE AND REGISTRATION TIMES
View 2013 Course Schedule

Class runs 8:30 am - 5:00 pm each day except on Thursday when it ends at 3:00 pm.

Registration is on Monday morning from 7:45 - 8:15 am.

Special events include a dinner for course participants and faculty on Monday night. Evening activities are included in tuition.

Please note that laptops are required for this course.

PARTICIPANTS' COMMENTS

ABOUT THE LECTURERS

Kent Larson

Kent Larson directs the Changing Places research group at the MIT Media Lab. He is also director of the MIT House_n Research Consortium and the MIT Living Labs initiative in the School of Architecture and Planning. Current research is focused on four related areas:

- Urban Mobility: integrated approaches to urban mobility that include shared-use, dynamically priced mobility systems as well as autonomous vehicle control for driverless parking and charging. The group is also developing strategies for creating mass-customized vehicles that take advantage of wheel robots, skateboard chassis, and drive-by-wire technology. The MIT Media Lab CityCar is one instance of this approach.

- CityHome: mass-customized, zero-energy urban housing that responds to the unique needs and values of individuals. Researchers are developing strategies to disentangle places of living into four independently configured layers: high-performance chassis; integrated, user-designed infill; responsive façade modules; and wireless technology. Several prototypes have been created with these concepts, including a zero-energy home at Unity College, Maine for the school's president and a multi-family apartment complex with customizable units in Cambridge, MA.

- Ubiquitous Technologies: wireless sensing, algorithms, and interfaces to understand and respond to human activity as well as environmental and market conditions. Projects range from fine-grain activity recognition using tiny wireless sensors, a persuasive thermostat using GPS location of occupants, and a context-aware tunable LED lighting for office environments.

- Living Lab Experiments: deploying and testing design and technology solutions in actual living environments. Studies have been conducted at the scale of the person, home, office, and city.

Larson practiced architecture for 15 years in New York City. He has won numerous design awards, with work published in Architectural Record, Progressive Architecture, Global Architecture, the New York Times, A+U, Architectural Digest, Metropolis, and Time Magazine as a "Best Design of the Year" project. His book, Louis I. Kahn: Unbuilt Masterworks was selected as one of the Ten Best Books in Architecture, 2000 by the New York Times Review of Books.

Ryan Chin

Dr. Ryan C.C. Chin is the managing director of the City Science Initiative at the MIT Media Lab. His research focuses on developing new urban systems for a post-oil, connected world. He earned his Ph.D. at the MIT Media Lab in 2012 by creating Mobility-on-Demand (MoD) Systems—a network of one-way, shared-use, lightweight electric vehicles (LEVs) enabled by electric charging infrastructure and smart fleet management systems. Under Dr. Chin's Leadership, the Smart Cities research group developed a series of LEVs for MoD systems in collaboration with industry, including the CityCar (with GM), RoboScooter (with Sanyang Motors), and the GreenWheel Electric Bicycle (start-up in Taiwan). Dr. Chin's research led to the group's first major publication, *Reinventing the Automobile: Personal Urban Mobility for the 21st Century*, written by William J. Mitchell (his advisor), Chris Borroni-Bird (GM), and Lawrence Burns (GM) and published by MIT Press in January of 2010.

Dr. Chin has also led MIT's collaboration with Hiriko, a new electric car manufacturer based in Spain, to develop a commercial version of the of the CityCar—a foldable, sharable, modular, electric two-passenger vehicle that utilizes four modular in-wheel electric motors with integrated steering and suspension (called Robot Wheels)—due for market release in summer of 2013.

Dr. Chin's Ph.D. thesis, entitled "Smart Customization: Making Evidence-Based Environmental Decisions," focused on the ability to improve the sustainability of products by utilizing Mass Customization strategies.

Chin has been a keynote speaker and panelist at conferences such as MIT's Emerging Technologies Conference (EmTech), TEDx, SIGGRAPH, Convergence, China Planning Network (CPN), MIT World, and Gridweek. Dr. Chin earned a Master of Science in Media Arts and Sciences (2004) and a Master of Architecture (2000) at MIT and Bachelor's degrees in Civil Engineering (1997) and Architecture (1997) from the Catholic University of America.

Websites:

- http://cities.media.mit.edu (City Science Initiative)
- http://cp.media.mit.edu (Changing Places)
- http://scg.mit.edu (Smart Customization)

LOCATION
This course takes place on the MIT campus in Cambridge, Massachusetts. We can also offer this course for groups of employees at your location. Please contact the Short Programs office for further details.

LINKS & RESOURCES
Video/Audio:

- MIT Media Lab's CityCar concept video - Download for Mac | Windows
- TEDxBoston: Ryan Chin talks about Smart Cities: Sustainable Urban Mobility-on-Demand
- TED Talk: Kent Larson on Rethinking Cities

News/Articles:

- The commercial version of CityCar launches in Brussels
- CityCar is soon to go into production as featured in the New York Times
- The Boston Globe celebrates MIT's 150th Anniversary with a list of 150 top innovations from the Institute--click here to read #114, the Next Zip Car and Ryan Chin
- MIT World: Ryan Chin talks about The CityCar
- The Futurist - Sustainable Urban Mobility in 2020, article by Ryan Chin
- eWeek video interview - Kent Larson of MIT Has a Platform for Smarter Cities

UPDATES
There are no updates at this time.