ICE-T Modules offered IAP and Spring 2020

Integrated Chemical Engineering Topics I (ICE-T I)
Two out of the three ICE-T subjects (10.492A or B/493/494A or B) are required

Note: Students cannot receive credit twice for the same course number

It is strongly recommended that those students planning to register for 10.492A or 10.492B do so on Registration Day for the Fall. Rules for adding 10.492A/B will follow normal MIT policy and must be done prior to Add Date. Rules for dropping 10.492 will also follow normal policy and must be done prior to Drop Date.

10.493 L01 (IAP) Electrochemical Energy - Batteries, Fuel Cells

Course Description: Energy technology plays a critical role on an individual and societal scale. Electrochemical energy conversion systems, such as batteries and fuel cells, find applications in personal power—e.g., handheld electronic devices; stationary home power; vehicles; and large scale power plants. Design, sizing, and choice of operation point are important considerations for appropriately engineering these potentially efficient electrochemical systems. Lectures and assignments address the ways that thermodynamics, electrochemical reaction, and transport factor into power, durability, and efficiency trade-offs. For the project, each group undertakes a detailed analysis of a single or hybrid combination of power sources, leading to design choices targeting a particular device and consumer use

Units: 2-0-4
Instructor: Javit Drake
Section 2: MTWRF 11am-1pm, 3pm-5pm 66-144
Dates: 1/6/2018-1/24/2020

10.494A Design of new processes for reducing GHG emissions in the energy sector

Course Description: Currently the transportation fuel sector is a major source of greenhouse gas emissions, both in the fuel production process (and ancillary processes handling or valorizing byproducts) as well as in direct fuel use by consumers, and the relative importance of this sector to global GHG emissions is expected to increase over the next 20 years. There is therefore great interest in reducing the greenhouse gas emissions associated with fuel production. This half-semester subject will give the students experience designing a new chemical engineering process to reduce GHG emissions from this sector, considering a wide range of technical, practical, economic, ethical, environmental, and societal-impact factors. While most of this subject will be focused on a design project done by a student team, there will also be some lectures and homework focused on specific issues, to help prepare the students to tackle this challenging design problem.

Units: 2-0-4
Instructor: Bill Green
Section 2: MWF 10am-11am 66-168
Dates: 2/3/20 - 3/20/20
ICE-T Modules offered IAP and Spring 2020

10.494B Nanomedicine

Course Description: Lipid nanoparticles are poised to revolutionize the treatment of genetic disease by enabling the therapeutic delivery of nucleic acids that can turn your genes off, turn them on, or even permanently and specifically edit your genome. This class will provide an overview of lipid nanoparticles and drug delivery including what nanoparticles are made of, how they will be used, and in particular how they are made and analyzed. Projects will focus on the application of chemical engineering principles to design a continuous nanoparticle formulation process for pharmaceutical scale production. This will include examination of small scale nanoparticle production procedures based on microfluidics, hands-on construction of nanoparticle formulation chips, and a study of how these devices might be adjusted to meet the needs of commercial-scale production.

Units: 2-0-4
Instructor: Dan Anderson
Section 2: MWF 10am-11am 66-168
Dates: 3/30/20 - 5/11/20

10.01 Ethics for Engineers

Course Description: Integrates classical readings that provide an overview of ethics with a survey of case studies that focus on ethical problems arising in the practice of engineering. Readings taken from a variety of sources, such as Aristotle, Machiavelli, Bacon, Hobbes, Locke, the Founding Fathers, and the Bible. Case studies include written analyses and films that address engineering disasters, biotechnology, court cases, ethical codes, and the ultimate scope and aims of engineering.

Units: 2-0-4
Instructors: Bernhardt L. Trout and Staff

Spring Schedule:
Sec 1: M 3pm-5pm 66-148
Sec 2: T 3pm-5pm 66-148
Sec 3: W 3pm-5pm 66-148
Sec 4: T 7pm-9pm 66-148
Sec 5: W 7pm-9pm 66-148
Dates 2/3/2020-5/12/2020