The Edgerton Center specializes in experiential learning and offers interactive subjects in electronics, high-speed photography, and video production. The center is also the home of D-Lab classes (see EC.700-EC.792).

Seminars

**EC.050 Re-create Experiments from History: Inform the Future from the Past**
Subject meets with EC.090
Prereq: None
U (Fall, IAP, Spring)
2-2-2 units

Provides perspective for thinking about the future through the study of historical physical science and historically significant experiments. Designed to build awareness of the unexpected through both observation of the sky and lab activities that focus on light, electricity, and motion. Labs are complemented by museum and site visits; readings include accounts by Galileo, Archimedes, and other historical observers. Individual and team assignments provide opportunities to develop skills in observation, exploration, and evaluation. Students must keep an observing notebook and write a reflective paper; students taking the graduate version complete additional assignments.

*J. Bales, E. Cavicchi*

**EC.074 The Start-up Experience at MIT**
Prereq: None
U (Fall)
2-0-4 units

Explores some of the critical actions in starting up a technology-based business, including concept generation, searching prior art and patents, protecting intellectual property, founders agreements, forming and building teams, and work-life balance. Students review case studies and complete exercises that develop practicable knowledge in these areas. Each student keeps an "idea log book," which includes critical assessments of each case study, to be presented at the end of the term. First in a two-part series (seminars do not have to be taken sequentially; see EC.075 in spring term). Preference to undergraduates; open to graduate students with permission of advisor.

*J. Hadzima*

**EC.075 Starting Up New Technology-Based Business Enterprises at MIT**
Prereq: None
U (Spring)
2-0-4 units

Seminar participants define and study the development stages of new enterprises at MIT, from the exciting moment a new idea for a tech product or service is realized, through to selling, customer support, and the next new idea. Follows the history of successful MIT spin-off companies with attention to the people (and their ideas) behind the start-up. Students attend MIT technology and science start-up case presentations given by individuals and teams working from zero-stage, and by partners in going concerns of historical relevance to the Institute and the economy. Second in a two-part series (seminars do not have to be taken sequentially; see EC.074 in fall term).

*J. G. Hadzima*

**EC.090 Re-create Experiments from History: Inform the Future from the Past**
Subject meets with EC.050
Prereq: None
G (Fall, IAP, Spring)
2-2-2 units

Provides perspective for thinking about the future through the study of historical physical science and historically significant experiments. Designed to build awareness of the unexpected through both observation of the sky and lab activities that focus on light, electricity, and motion. Labs are complemented by museum and site visits; readings include accounts by Galileo, Archimedes, and other historical observers. Individual and team assignments provide opportunities to develop skills in observation, exploration, and evaluation. Students must keep an observing notebook and write a reflective paper; students taking the graduate version complete additional assignments.

*J. Bales, E. Cavicchi*
Electronics and Programming

**EC.110[J]** Introduction to Digital Electronics
Same subject as 6.072[J]
Prereq: None
U (Spring)
0-3-3 units

Design your own circuits for times when off-the-shelf solutions are not available. Seminar begins with assembly of a utility board. Weekly labs cover digital logic gates, memory elements, and finite-state machine design. Seminar concludes with a team-based design project. Preference given to freshmen. Maximum of 10 students per term, lottery at the first class session if oversubscribed.

*J. Bales*

**EC.120[J]** Electronics Project Laboratory
Same subject as 6.070[J]
Prereq: None
U (Fall, Spring)
2-2-2 units

See description under subject 6.070[J]. Enrollment may be limited.

*J. Bales*

Imaging and Visualization

**EC.210 Visualization for Mathematics, Science, and Technology Education**
Prereq: None
U (Spring)
3-2-7 units

Introduces principles and techniques for visual communication of educational concepts in mathematics, the natural sciences, and engineering. Students complete interactive assignments and class activities in visual arts media, such as photography, illustration, stop-motion and computer animation, and web graphics. A final project in a visual arts medium of the student’s choice must meet professional aesthetic standards for visualization; it must also be applicable for teaching and learning concepts in mathematics, science, or engineering in a formal or informal setting. Coursework requires use of production equipment (e.g., photo and video cameras) and software tools (Adobe Creative Suite, Final Cut Studio, and Maya) at the New Media Center. Limited to 18.

*V. Ivanova*

Media and Production

**EC.305 Digital and Darkroom Imaging**
Subject meets with EC.A305
Prereq: None
U (Fall)
2-0-4 units
Credit cannot also be received for EC.310

Students use both film and digital photography to develop a creative imaging project of their own choice. Develops skills in the use of image editing software to enhance, select, and combine images that the student has taken. Uses the darkroom to develop film for scanning and for chemical enlargement. Discusses topics such as the camera, composition, lighting, modes and formats, image compression, and halftone and dye sublimation printing. Students are expected to produce a duplicate set of black and white and/or color prints, along with a writeup and digital copy as the project output.

*T. Mislick*

**EC.310 Creative Imaging**
Prereq: None
U (Spring)
2-1-6 units. HASS-E
Credit cannot also be received for EC.305, EC.A305

Focuses on film and digital photography. Develops skill in the use of chemical darkrooms, scanners, digital printers and cameras to create striking still images capable of evoking strong emotional and intellectual responses from a viewer. Emphasizes the interplay between classical chemical and digital techniques and how they can be used to control the use of lighting, color, depth, and composition in an image. Students present their intermediate assignments to the class for critical discussion; at the end of the term, they submit a substantive project presenting their own creative images for critique and evaluation.

*T. Mislick, J. K. Vandiver*
D-Lab

**EC.700 D-Lab: Field Study**
Prereq: One D-Lab subject and permission of instructor
U (IAP)
Units arranged
Can be repeated for credit.

Provides the opportunity to gain direct fieldwork experience in a global context. Subject spans three-four weeks in which students continue work from a prior D-Lab subject. Students work directly with international community partners to find solutions to real world problems, focusing on one or more issues in education, design, or public service. Group presentations and written reflection required.

A. B. Smith, S. L. Hsu

**EC.701[J] D-Lab: Development**
Same subject as 11.025[J]
Subject meets with 11.472[J], EC.781[J]
Prereq: None
U (Fall)
3-2-7 units. HASS-S

Issues in international development, appropriate technology and project implementation addressed through lectures, case studies, guest speakers and laboratory exercises. Students form project teams to partner with community organizations in developing countries, and formulate plans for an optional IAP site visit. (Previous field sites include Ghana, Brazil, Honduras and India.) Recitation sections focus on specific project implementation, and include cultural, social, political, environmental and economic overviews of the target countries as well as an introduction to the local languages. Enrollment limited by lottery; must attend first class session.

S. L. Hsu, A. B. Smith, B. Sanyal

**EC.702[J] Cross-Cultural Investigations: Technology and Development**
Same subject as 21A.801[J], STS.071[J]
Subject meets with EC.792, 21A.839[J], STS.481[J]
Prereq: None
Acad Year 2018-2019: Not offered
Acad Year 2019-2020: U (Spring)
3-0-9 units. HASS-S

See description under subject 21A.801[J].
C. Walley

**EC.711[J] Introduction to Energy in Global Development**
Same subject as 2.651[J]
Subject meets with EC.791
Prereq: None
U (Spring)
3-2-7 units

Provides an overview of thermodynamics and heat transfer through an international development context to impart energy literacy and common sense applications. Students survey various alternative energy technologies and strategies for implementation in developing countries. Focuses on compact, robust, low-cost systems for generating electrical power and meeting household-level needs. Labs reinforce lecture material through deconstruction, system assembly, and sensor installation to track performance. Team projects involve activities, such as researching community needs, assessing the suitability of specific technologies, continuing the development of ongoing projects, and assessing the efficacy and impacts of existing projects. Optional summer fieldwork may be available. Students taking graduate version complete additional assignments. Enrollment limited by lottery; must attend first class session.

S. L. Hsu, A. Gandhi

**EC.712 D-Lab: Energy II**
Subject meets with EC.782
Prereq: EC.711[J] or permission of instructor
U (Fall)
3-0-9 units

Engages students in advancing the United Nations’ Sustainable Development Goal 7, which seeks to ensure access to affordable, reliable, sustainable, and modern energy systems, through community-based approaches. Teams work on off-grid energy projects that focus on lighting, cooking, indoor heating, agricultural productivity, or other solutions to advance fieldwork with pre-selected community partners. Working at various stages along D-Lab’s Off-Grid Energy Roadmap, teams consider needs assessment, technology and business model identification, and implementation strategies. Project work includes combinations of analysis, design, prototyping, and implementation. Optional January site visits may be available to test and implement projects. Students taking graduate version complete additional assignments. Limited to 20.

E. Verploegen

**EC.713[J] D-Lab Schools: Building Technology Laboratory**
Same subject as 4.411[J]
Prereq: Calculus I (GIR) and Physics I (GIR)
U (Fall)
2-3-7 units. Institute LAB

See description under subject 4.411[J].
L. K. Norford
EC.715 D-Lab: Water, Sanitation and Hygiene  
Subject meets with 11.474  
Prereq: None  
U (Fall)  
3-0-9 units  

Focuses on disseminating Water, Sanitation and Hygiene (WASH) or water/environment innovations in developing countries and underserved communities worldwide. Structured around field-based learning, case studies, lectures and videos in which teams propose an idea and are mentored through the process of bringing that innovation to fruition. Emphasizes core WASH and water/environment principles, culture-specific solutions, tools for startups, appropriate and sustainable technologies, behavior change, social marketing, building partnerships, and the theory and practice of innovation diffusion. Term project entails entering the IDEAS or other competition(s) while implementing a WASH innovation in a specific locale. Guest lectures on specific real-world WASH projects which have been disseminated by MIT faculty, students, alumni, and others. Students taking graduate version complete additional assignments. Limited to 30.

S. E. Murcott, S. L. Hsu

EC.716 D-Lab: Waste  
Subject meets with EC.786  
Prereq: None  
Acad Year 2018-2019: Not offered  
Acad Year 2019-2020: U (Fall)  
3-0-6 units  

Uses a multi-disciplinary approach to understand global challenges related to waste. Discusses cradle-to-cradle design, upcycling, diminishment of environmental impacts, and enterprise opportunities for marginalized populations. Studies zero-waste strategies worldwide; examines different models of collection, recycling, waste management, and businesses developed in low-income settings; and researches public policy that supports sustainable, integrated waste management systems. Teams develop solutions around waste-related challenges, in partnership with wastepickers, municipal governments, and private sector and community organizations. Includes guest speakers and field trips, as well as opportunities for IAP or summer travel. Students taking graduate version complete additional assignments.

K. Mytty

EC.717 D-Lab: Education and Learning  
Subject meets with EC.787  
Prereq: None  
U (Spring)  
2-2-5 units  

Provides an overview of pedagogical theories and core teaching skills that allow students to craft their own K-12 curriculum using the design process. Working in groups and collaborating with an international partner, students use the design process to create a final project for a specific audience that emphasizes hands-on, inclusive, project-based learning. Suitable for students with varying levels of teaching experience. Local fieldwork and K-12 classroom visits are required throughout the semester and international fieldwork may be available to students in the summer. Students taking graduate version complete additional assignments. Limited to 10.

L. Nam, S. Hsu

EC.718 D-Lab: Gender and Development  
Subject meets with EC.798  
Prereq: None  
U (Fall)  
4-3-5 units  

Explores gender roles, illuminates the power dynamics and root causes of inequality, and provides a framework for understanding gender dynamics. Develops skills to conduct a gender analysis and integrate gender-sensitive strategies into large- and small-scale development solutions. Prompts critical discussion about social, economic, and political conditions that shape gender in development. Begins with exploration of international development in the post-colonial era, using a gender lens, then provides students with the tools to integrate gender-sensitive strategies into international development work, with a particular focus on launching, building and scaling women’s ventures. Opportunities may be available for international fieldwork over IAP. Students taking graduate version complete additional assignments. Limited to 12; must attend first class session.

E. McDonald, K. Mytty
**EC.719 D-Lab: Water, Climate Change, and Health**
Subject meets with EC.789  
Prereq: None  
U (Spring)  
3-4-5 units  

Addresses mitigation and adaptation to climate change as it pertains to water and health. Focuses on regions where water-borne illness, malnutrition, and vector-borne diseases - problems that will worsen with increasing temperatures and urban overcrowding - represent the top three causes of morbidity and mortality. Includes readings, workshops and films that address water, climate change and health challenges and explore solutions. Field trips include coastal watershed restoration, flood protection, carbon sequestration, and zero-carbon sites in the Boston area. Students complete a term project and/or teach a class, setting the stage for a life-long commitment to communicating climate science to a broad public. Students taking graduate version complete additional assignments.  
S. Murcott, J. Simpson, V. Gupta

**EC.720[J] D-Lab: Design**  
Same subject as 2.722[J]  
Prereq: 2.670 or permission of instructor  
U (Spring)  
3-0-9 units  

Addresses problems faced by underserved communities with a focus on design, experimentation, and prototyping processes. Particular attention placed on constraints faced when designing for developing countries. Multidisciplinary teams work on long-term projects in collaboration with community partners, field practitioners, and experts in relevant fields. Topics covered include design for affordability, manufacture, sustainability, and strategies for working effectively with community partners and customers. Students may continue projects begun in EC.701[J]. Enrollment limited by lottery; must attend first class session.  
S. Hsu, S. Grama

**EC.721 D-Lab: Mobility Technology for, by, and with People with Disabilities**  
Prereq: None  
Acad Year 2018-2019: Not offered  
Acad Year 2019-2020: U (Fall)  
2-2-5 units  

Students improve wheelchair technology in developing countries by applying sound engineering practices to create appropriate devices. Lectures focus on wheelchair usage, social stigmas, and manufacturing constraints. Includes lectures by third-world community partners, US wheelchair organizations, and MIT faculty. Multidisciplinary student teams conduct term-long wheelchair projects relating to hardware design. Funded opportunities available for travel to implement class projects at wheelchair workshops in the field.  
M. McCambridge

**EC.722 Prosthetics for the Developing World**  
Prereq: None  
U (Spring)  
Not offered regularly; consult department  
2-2-5 units  

Introduces the fundamentals of human walking. Provides an overview of different types of gait disabilities and the available technologies that address them. Presents patient perspective as well as current areas of research. Topics focus on lower-limb disabilities, such as polio and above- and below-knee amputation. Covers both developed and developing world techniques for overcoming these disabilities. Includes a term project in which teams of 3 to 5 students manufacture a prototype. Teams meet outside of class and work with a TA (project mentor) to research, design, prototype, and test a solution. Projects focus on low-cost orthotic and prosthetic knee designs for the developing world, as specified by partner organizations in India and Guatemala.  
M. McCambridge
EC.724 D-Lab: Smallholder Agriculture
Subject meets with EC.784
Prereq: None
U (Spring)
3-0-6 units
Provides an overview of the scientific, social, and economic context of smallholder farmers in developing countries. Includes scientific basis and environmental impacts of agriculture, the dynamics of smallholder farming, social and business systems, and focuses on the experience of farmers themselves. Also includes guest experts, experiential activities, and term projects with community partners. Opportunities for summer fieldwork may be available. Students taking graduate version complete additional assignments. Limited to 15.
R. Nanes, G. Jones, S. Hsu

EC.729[J] D-Lab: Design for Scale
Same subject as 2.729[J]
Prereq: Permission of instructor
U (Fall)
3-2-7 units
Focuses on product development of technologies for people in less industrialized markets. Students work in interdisciplinary teams to develop previously established prototypes or technologies towards manufacturing-ready product designs. Topics are presented within the context of the developing world and include technology feasibility and scalability assessment; value chain analysis; product specification; design for affordability, manufacturability, usability, and desirability; and product testing and manufacturing at various scales. Lessons are experiential and case study-based; taught by instructors with field experience and by industry experts from product development consulting firms and the consumer electronics industry.
M. Yang

EC.731[J] Development Ventures
Same subject as 15.375[J], MAS.665[J]
Prereq: Permission of instructor
G (Fall)
3-0-9 units
See description under subject MAS.665[J].
J. Bonsen, A. Pentland, C. Breazeal

EC.733[J] D-Lab: Supply Chains
Same subject as 15.772[J]
Prereq: None
U (Fall)
3-3-6 units
See description under subject 15.772[J].
S. C. Graves

EC.740 D-Lab: Inclusive Economies
Prereq: None
U (Spring)
3-0-6 units
Explores the ideas behind and actions toward alternatives to the corporate-driven globalization economic model. Begins with review and analysis of the worldviews that led to the current system and the theoretical and empirical arguments embraced by its critics. Examines concepts and case studies for developing new opportunities, including circular and local economies. Concludes with an experiential component in which students apply the concepts to develop a strategy (economic, policy, or other) for building on and contributing to a sustainable and inclusive local economy in a mid-sized city in Nicaragua. Potential opportunities for travel over summer. Limited to 12.
E. McDonald, K. Mytty

EC.746[J] Design for Complex Environmental Issues: Building Solutions and Communicating Ideas
Same subject as 1.016[J], 2.00C[J]
Prereq: None
U (Spring)
3-1-5 units
Students work in small groups, under the guidance of researchers from MIT, to pursue specific aspects of the year's Terrascope problem. Teams design and build prototypes, graphic displays and other tools to communicate their findings and display them in a Bazaar of Ideas open to the MIT community. Some teams develop particular solutions, others work to provide deeper understanding of the issues, and others focus on ways to communicate these ideas with the general public. Students' work is evaluated by independent experts. Offers students an opportunity to develop ideas from the fall semester and to work in labs across MIT. Limited to first-year students.
A. W. Epstein, S. L. Hsu
EC.750 Humanitarian Innovation: Design for Relief, Rebuilding, and Recovery
Subject meets with EC.785
Prereq: None
U (Spring)
4-0-8 units

Explores the role innovation can and does play in how humanitarian aid is provided, and how it can impact people, products, and processes. Provides a fundamental background in the history and practice of humanitarian aid. Considers the various ways that design can be used to enhance aid, such as product and system design for affected populations, co-creation with affected populations, and capacity building to promote design by refugees and the displaced. Case studies and projects examine protracted displacement as well as recovery and resettlement, including efforts in Colombia, Lebanon, Nepal, Sudan, and Uganda. Potential for students to travel over the summer to partner communities.
A. Smith, M. Thompson

EC.770 D-Lab: Independent Project
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

Opportunity for independent study under regular supervision by a staff member. Projects require prior approval, as well as a written proposal and final report. Students work with international community partners to continue developing projects, focusing on one or more issues in education, design, or public service. Final presentations and written reflection required. May be repeated for credit for a maximum of 12 units.
S. L. Hsu

EC.780 D-Lab: Independent Project
Prereq: None
G (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.

Opportunity for independent study under regular supervision by a staff member. Projects require prior approval, as well as a written proposal and final report. Students work with international community partners to continue developing projects, focusing on one or more issues in education, design, or public service. Final presentations and written reflection required. May be repeated for credit for a maximum of 12 units.
S. L. Hsu

EC.781(J) D-Lab: Development
Same subject as 11.472(J)
Subject meets with 11.025(J), EC.701(J)
Prereq: None
G (Fall)
3-2-7 units

Issues in international development, appropriate technology and project implementation addressed through lectures, case studies, guest speakers and laboratory exercises. Students form project teams to partner with community organizations in developing countries, and formulate plans for an optional IAP site visit. (Previous field sites include Ghana, Brazil, Honduras and India.) Recitation sections focus on specific project implementation, and include cultural, social, political, environmental and economic overviews of the target countries as well as an introduction to the local languages. Enrollment limited by lottery; must attend first class session.
S. L. Hsu, A. B. Smith, B. Sanyal

EC.782 D-Lab: Energy II
Subject meets with EC.712
Prereq: EC.791 or permission of instructor
G (Fall)
3-0-9 units

Engages students in advancing the United Nations' Sustainable Development Goal 7, which seeks to ensure access to affordable, reliable, sustainable, and modern energy systems, through community-based approaches. Teams work on off-grid energy projects that focus on lighting, cooking, indoor heating, agricultural productivity, or other solutions to advance fieldwork with pre-selected community partners. Working at various stages along D-Lab's Off-Grid Energy Roadmap, teams consider needs assessment, technology and business model identification, and implementation strategies. Project work includes combinations of analysis, design, prototyping, and implementation. Optional January site visits may be available to test and implement projects. Students taking graduate version complete additional assignments. Limited to 20.
E. Verploegen
EC.784 D-Lab: Smallholder Agriculture
Subject meets with EC.724
Prereq: None
G (Spring)
3-0-6 units

Provides an overview of the scientific, social, and economic context of smallholder farmers in developing countries. Includes scientific basis and environmental impacts of agriculture, the dynamics of smallholder farming, social and business systems, and focuses on the experience of farmers themselves. Also includes guest experts, experiential activities, and term projects with community partners. Opportunities for summer fieldwork may be available. Students taking graduate version complete additional assignments. Limited to 15.
R. Nanes, G. Jones, S. Hsu

EC.785 Humanitarian Innovation: Design for Relief, Rebuilding, and Recovery
Subject meets with EC.750
Prereq: None
G (Spring)
4-0-8 units

Explores the role innovation can and does play in how humanitarian aid is provided, and how it can impact people, products, and processes. Provides a fundamental background in the history and practice of humanitarian aid. Considers the various ways that design can be used to enhance aid, such as product and system design for affected populations, co-creation with affected populations, and capacity building to promote design by refugees and the displaced. Case studies and projects examine protracted displacement as well as recovery and resettlement, including efforts in Colombia, Lebanon, Nepal, Sudan, and Uganda. Potential for students to travel over the summer to partner communities.
A. Smith, M. Thompson

EC.786 D-Lab: Waste
Subject meets with EC.716
Prereq: None
Acad Year 2018-2019: Not offered
Acad Year 2019-2020: G (Fall)
3-0-6 units

Uses a multi-disciplinary approach to understand global challenges related to waste. Provides a platform for initiatives such as cradle-to-cradle design, upcycling, diminishment of environmental impacts, and enterprise opportunities for marginalized populations. Studies zero-waste strategies worldwide; examines different models of collection, recycling, waste management, and businesses developed in low-income settings; and researches public policy that supports sustainable, integrated waste management systems. Teams engage in development of solutions around waste-related challenges, in partnership with wastepickers, municipal governments, and private sector and community organizations. Includes guest speakers and field trips, as well as opportunities for IAP or summer travel. Students taking graduate version complete additional assignments.
K. Mytty

EC.787 D-Lab: Education and Learning
Subject meets with EC.717
Prereq: None
G (Spring)
2-2-5 units

Provides an overview of pedagogical theories and core teaching skills that allow students to craft their own K-12 curriculum using the design process. Working in groups and collaborating with an international partner, students use the design process to create a final project for a specific audience that emphasizes hands-on, inclusive, project-based learning. Suitable for students with varying levels of teaching experience. Local fieldwork and K-12 classroom visits are required throughout the semester and international fieldwork may be available to students in the summer. Students taking graduate version complete additional assignments. Limited to 10.
L. Nam, S. Hsu
EC.788 D-Lab: Field Research
Prereq: Permission of instructor
G (Spring)
3-0-9 units
Combines hands-on methods for conducting field research with exploration of questions that continue to challenge practitioners, donors, policymakers and researchers in international development. Designed for students preparing to conduct field-based research for theses, product design project, or development ventures. Practices key research skills particularly applicable to conducting research involving people and communities in the context of development. Limited to 16.
E. Moreno

EC.789 D-Lab: Water, Climate Change, and Health
Subject meets with EC.719
Prereq: None
G (Spring)
3-4-5 units
Addresses mitigation and adaptation to climate change as it pertains to water and health. Focuses on regions where water-borne illness, malnutrition, and vector-borne diseases - problems that will worsen with increasing temperatures and urban overcrowding - represent the top three causes of morbidity and mortality. Includes readings, workshops and films that address water, climate change and health challenges and explore solutions. Field trips include coastal watershed restoration, flood protection, carbon sequestration, and zero-carbon sites in the Boston area. Students complete a term project and/or teach a class, setting the stage for a life-long commitment to communicating climate science to a broad public. Students taking graduate version complete additional assignments.
S. Murcott, J. Simpson, V. Gupta

EC.790 D-Lab: Field Study
Prereq: One D-Lab subject and permission of instructor
G (IAP)
Units arranged
Can be repeated for credit.
Provides the opportunity to gain direct fieldwork experience in a global context. Subject spans three-four weeks in which students continue work from a prior D-Lab subject. Students work directly with international community partners to find solutions to real world problems, focusing on one or more issues in education, design, or public service. Group presentations and written reflection required.
S. Hsu

EC.791 Introduction to Energy in Global Development
Subject meets with 2.651[J], EC.711[J]
Prereq: None
G (Spring)
3-2-7 units
Provides an overview of thermodynamics and heat transfer through an international development context to impart energy literacy and common sense applications. Students survey various alternative energy technologies and strategies for implementation in developing countries. Focuses on compact, robust, low-cost systems for generating electrical power and meeting household-level needs. Labs reinforce lecture material through deconstruction, system assembly, and sensor installation to track performance. Team projects involve activities, such as researching community needs, assessing the suitability of specific technologies, continuing the development of ongoing projects, and assessing the efficacy and impacts of existing projects. Optional summer fieldwork may be available. Students taking graduate version complete additional assignments. Enrollment limited by lottery; must attend first class session.
S. L. Hsu, A. Gandhi

EC.792[J] Cross-Cultural Investigations: Technology and Development
Same subject as 21A.839[J], STS.481[J]
Subject meets with EC.702[J], 21A.801[J], STS.071[J]
Prereq: None
Acad Year 2018-2019: Not offered
Acad Year 2019-2020: G (Spring)
3-0-9 units
See description under subject 21A.839[J].
C. Walley
EC.798 D-Lab: Gender and Development
Subject meets with EC.718
Prereq: None
G (Fall)
4-3-5 units

Explores gender roles, illuminates the power dynamics and root causes of inequality, and provides a framework for understanding gender dynamics. Develops skills to conduct a gender analysis and integrate gender-sensitive strategies into large- and small-scale development solutions. Prompts critical discussion about social, economic, and political conditions that shape gender in development. Begins with exploration of international development in the post-colonial era, using a gender lens, then provides students with the tools to integrate gender-sensitive strategies into international development work, with a particular focus on launching, building and scaling women's ventures. Opportunities may be available for international fieldwork over IAP. Students taking graduate version complete additional assignments. Limited to 12; must attend first class session.
_E. McDonald, K. Mytty_

Teaching, UROP, Independent Study

EC.900 Independent Study
Prereq: None
U (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

Opportunity for independent study under regular supervision by a staff member. Projects require prior approval, as well as a written proposal and final report.
_Staff_

EC.910 Edgerton Center Undergraduate Teaching
Prereq: None
U (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

An opportunity for undergraduates to participate in teaching and tutoring Center subjects and seminars. Students develop one-on-one teaching skills under the supervision of an Edgerton Center instructor.
_Staff_

EC.980 Edgerton Center Independent Study - Graduate
Prereq: None
G (Fall, IAP, Spring, Summer)
Units arranged
Can be repeated for credit.

Opportunity for independent study under regular supervision by a staff member. Projects require prior approval, as well as a written proposal and final report.
_Staff_

EC.990 Edgerton Center Graduate Teaching
Prereq: None
G (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

An opportunity for graduate students to participate in teaching and tutoring Edgerton Center subjects and seminars. Permission of Edgerton Center staff required.
_Staff_

EC.UR Undergraduate Research
Prereq: None
U (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

Undergraduate research opportunities in the Edgerton Center.
_J. K. Vandiver_

EC.URG Undergraduate Research
Prereq: None
U (Fall, IAP, Spring, Summer)
Units arranged
Can be repeated for credit.

Undergraduate research opportunities in the Edgerton Center.
_J. K. Vandiver_
Special Subjects

EC.S00 Special Subject at the Edgerton Center
Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

EC.S01 Special Subject at the Edgerton Center
Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

EC.S02 Special Subject at the Edgerton Center
Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

EC.S03 Special Subject at the Edgerton Center
Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

Edgerton Center (EC)
EC.S05 Special Subject at the Edgerton Center

Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

EC.S06 Special Subject at the Edgerton Center

Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

EC.S07 Special Subject at the Edgerton Center

Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

EC.S08 Special Subject at the Edgerton Center

Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

EC.S09 Special Subject at the Edgerton Center

Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff

EC.S10 Special Subject at the Edgerton Center

Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

Staff
**EC.S11 Special Subject at the Edgerton Center**
Prereq: None
G (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

*Staff*

**EC.S12 Special Subject at the Edgerton Center**
Prereq: None
G (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

*Staff*

**EC.S13 Special Subject at the Edgerton Center**
Prereq: None
G (Fall)
Units arranged
Can be repeated for credit.

Seminar combining lectures and lab run by students and academic staff at the Edgerton Center. Students explore specialized electronics, robotics, or mechanical design and fabrication topics not offered in the regular curriculum; classes range from beginner level to more advanced. Some offerings may be taught in an intensive fashion (meeting for up to several times a week for four weeks). Up to three sequential seminars may be offered per semester, covering a different topic each time. Students can take one or all of the seminars.

*Staff*