

Study Areas and Course Descriptions

In course titles, *a* designates fall term, *b* designates spring term, and *c* designates summer. [Bracketed courses are not offered in 2009–2010.] The School reserves the right to change the prescribed course of study as necessary.

DESIGN AND VISUALIZATION

John Eberhart and Hilary Sample, Study Area Coordinators

This study area encompasses required studios, elective advanced studios, and courses that concentrate on design logic and skills and that support design thinking and representation.

For the M.Arch. I program, required courses in this study area include a core sequence of four design studios, the first-year building project, two advanced studios, a course in formal analysis (1018a), and a four-stage sequence of courses that deal specifically with visualization methodologies. The core studio sequence progresses from spatially abstract exercises to more complex programs that require integrative thinking at various scales and situated on sites of increased complexity, while integrating ecological, landscape, and tectonic demands. In all four stages of the visualization sequence, hand, digital, 2D, and 3D methods are explored. The first course (1001c) of this visualization sequence is a summer course required for entering students who have not had significant prior architectural training. The next three courses (1015a, 1016b, and 1017c)—in the fall, spring, and early summer of the first year—are required of all M.Arch. I students.

For the M.Arch. II program, required courses in this study area include a core design studio (1061a), three advanced studios, and a course in computation analysis and fabrication (1062a).

Required Courses

1001c, Visualization I: Observation and Representation 0 credits. Required

of incoming M.Arch. I students with little or no academic background in architecture, this summer course is an intensive, five-week immersion to give students a shared inventory and basic framework upon which to build their subsequent studies. The language of architectural representation and visualization and its connection to design are explored in both a studio and a lecture/history format. Students are introduced to techniques and conventions—including orthographic drawing, axonometric projection, perspective, architectural diagramming, vignette sketching, and physical modeling—used to describe the space and substance of buildings and urban environments. Students work in freehand, hard-line, and digital drawing and representation formats. They are also asked to examine precedents in architectural history offering examples of spatial and visual acuity. George Knight, coordinator; Kyle Dugdale, Joyce Hsiang

1011a, Architectural Design (formerly 501a) 6 credits. (Required in M.Arch. I first year, fall term.) This studio is the first of four core design studios where beginning students bring to the School a wide range of experience and background. Exercises introduce the complexity of architectural design by engaging problems that are limited in scale but not in the issues they provoke. Experiential, social, and material concerns are introduced together with formal and conceptual issues. Ben Pell, coordinator; Sunil Bald, Martin Cox, Joyce Hsiang, Jennifer Leung

1012b, Architectural Design (formerly 502b) 3 credits. (Required in M.Arch. I first year, spring term.) This second core studio explores the theme of domestic architecture through the design and construction of dwelling space. During the first half of the term, a series of analysis and design projects explore the typological precedents, programmatic organization, formal composition, and construction methodology of individual and multiple-unit housing. This work forms the conceptual background for the work in the latter half of the term—the collaborative design and construction of the Building Project, an affordable house for a nonprofit developer in New Haven. Prerequisite: 1011a. Alan Organschi, coordinator; Andrew Benner, Peter de Bretteville, Amy Lelyveld, Joeb Moore

1013b, Building Project (formerly 506b) 3 credits. (Required in M.Arch. I first year, spring term.) Weekly sessions develop the building and management skills needed for the Building Project. The experience focuses on the means of understanding the process, practice, and scope of the profession. The course involves client contact, programming, design, budgeting, working documentation, and actual construction. It integrates work with a nonprofit client, design of neighborhood infrastructure, and public service practice. The project extends beyond the normal end of spring term; all first-year students are required to work on the project from April 26 through June 25. For more information, see the section on the Building Project on the Web:

www.architecture.yale.edu. Prerequisite: 1011a. Herbert Newman, Building Project coordinator; Adam Hopfner, director; Paul Brouard and faculty

1015a, Visualization II: Form and Representation (formerly 802a) 3 credits. (Required in M.Arch. I first year, fall term.) This course investigates drawing as a means of architectural communication and as a generative instrument of formal, spatial, and tectonic discovery. Principles of two- and three-dimensional geometry are extensively studied through a series of exercises that employ freehand and constructive techniques. Students work fluidly between manual drawing, computer drawing, and material construction. All exercises are designed to enhance the ability to visualize architectural form and volume three-dimensionally, understand its structural foundations, and provide tools that reinforce and inform the design process. Sunil Bald, Kent Bloomer

1016b, Visualization III: Fabrication and Assembly 3 credits. (Required in M.Arch. I first year, spring term.) This course provides an introduction to the key relationships that exist among methods of drawing, physical materials, technologies of construction, and three-dimensional form making. The material and formal sensibilities developed in 1015a, Visualization II are mined to explore drawing as a tool leading to full-scale fabrication. The generation of form through both manual and digital methods is tested through materials and technologies of fabrication. Additive and subtractive processes, repetition and mass production, and building information modeling (BIM) are introduced as tools for assembly.

“Assembly” is framed as both full-scale object and “three-dimensional” analog. Exercises and workshops provide students the opportunity to work physically with a wide variety of tools and materials as well as digitally with emerging computer driven technologies. In this course conceived as a supplement to 1013b, Building Project, students integrate drawing and model-making to develop and propose a construction that can be experienced at the human scale and be understood as an integrated architectural element. John Eberhart, Ben Pell

1017c, Visualization IV: Processing and Presentation 3 credits. (Required in M.Arch. I first year, early summer.) This course synthesizes “representation” with “presentation” by exploring how dynamic processes—both analytical and communicative—shape the design of architecture. Students engage a wide variety of media, analyzing and representing a space or sequence of spaces through freehand drawing and re-presenting those drawings through digital techniques. Computer animation, parametric drawing, and interactive graphics are used to explore authorship and observation. The course integrates the content of the preceding visualization sequence courses while allowing students to expand their representational repertoires and develop individual expressive approaches. This course is taught from May 10 until June 25. Brennan Buck, John Eberhart, George Knight

1018a, Formal Analysis (formerly 801a) 3 credits. (Required in M.Arch. I first year, fall term; available as an elective for M.Arch.II and M.E.D. students.) This course studies the object of architecture—canonical buildings in the history of architecture—not through the lens of reaction and nostalgia but through a filter of contemporary thought. The emphasis is on learning how to see and to think architecture by a method that can be loosely called “formal analysis.” The analyses move through history and conclude with examples of high modernism and postmodernism. Reading assignments and one formal analysis are assigned each week. Peter Eisenman

1021b, Architectural Design (formerly 503a) 6 credits. (Required in M.Arch. I second year, fall term.) This third core studio concentrates on a medium-scale

institutional building, focusing on the integration of program, site, composition, form in relation to structure, and methods of construction. Interior spaces are studied in detail. Large-scale models and drawings are developed to explore design issues. Prerequisites: 1011a, 1012b. Mark Foster Gage, coordinator; Peter de Bretteville, Makram el Kadi, Martin Finio, M.J. Long, Joel Sanders, faculty

1022b, Architectural Design (formerly 504b) 6 credits. (Required in M.Arch. I second year, spring term.) This fourth core studio, an introduction to the planning and architecture of cities, concerns two distinct scales of operation: that of neighborhood and that of the dwellings and the institutional and commercial building types that typically contribute to neighborhood. Issues of community, group form, and the public realm, as well as the formation of public space, blocks, streets, and squares are emphasized. The studio is organized to follow a distinct design methodology, which begins with the study of context and precedents. It postulates that new architecture can be made as a continuation and extension of normative urban structure and building typologies. Prerequisites: 1011a, 1012b, 1021a. Edward Mitchell, coordinator; Ljiljana Blagojević, Peggy Deamer, Alexander Felson, Andrea Kahn

1061a, Post-Professional Design Studio (formerly 509a) 9 credits. (Required in and limited to M.Arch. II first year, fall term.) This studio is specially designed for incoming post-professional students to introduce them to the School's educational program and faculty. Each student is given the opportunity to examine in depth a sequence of design problems. Fred Koetter, Edward Mitchell

1062a, Computation Analysis Fabrication (formerly 853a) 3 credits. (Required in, and limited to, M.Arch. II, first year, fall term.) This course investigates and applies emerging computational theories and technologies through the design and fabrication of a full-scale building component and/or assembly. This investigation includes various static, parametric, and scripted modeling paradigms, computational based structural and sustainability analysis, and digital fabrication technologies. Students work in pairs to design, analyze, and fabricate a full-scale constructed piece. John Eberhart

Advanced Design Studios (Fall)

Advanced studios are limited in enrollment. Selection for studios is determined by lottery.

1101a, Advanced Design Studio 9 credits. Program to be announced. Lise Anne Couture, Davenport Visiting Professor

1102a, Advanced Design Studio 9 credits. Program to be announced. Leon Krier, Davenport Visiting Professor

1103a, Advanced Design Studio 9 credits. Program to be announced. Greg Pasquarelli, Bishop Visiting Professor

1104a, Advanced Design Studio 9 credits. Program to be announced. Peter Eisenman, Kahn Visiting Professor

1105a, Advanced Design Studio 9 credits. Program to be announced. Stefan Behnisch, Saarinen Visiting Professor

1106a, Advanced Design Studio 9 credits. Program to be announced. Eric Bunge and Mimi Hoang, Kahn Visiting Assistant Professors

1107a, Advanced Design Studio 9 credits. Program to be announced. Alan Plattus

Advanced Design Studios (Spring)

Advanced studios are limited in enrollment. Selection for studios is determined by lottery.

1111b, Advanced Design Studio 9 credits. Program to be announced. Greg Lynn, Davenport Visiting Professor

1112b, Advanced Design Studio 9 credits. Program to be announced. Sean Griffiths, Charles Holland, and Sam Jacob, Bishop Visiting Professors

1113b, Advanced Design Studio 9 credits. Program to be announced. Patrick

Bellew and Andy Bow, Saarinen Visiting Professors

1114b, Advanced Design Studio 9 credits. Program to be announced.

Christopher Perry, Kahn Visiting Assistant Professor

1115b, Advanced Design Studio 9 credits. Program to be announced. Deborah

Berke; Katherine Farley, Bass Distinguished Visiting Architecture Fellow

1116b, Advanced Design Studio 9 credits. Program to be announced. Mark

Foster Gage

1117b, Advanced Design Studio 9 credits. Program to be announced. Hilary

Sample

1118b, Advanced Design Studio 9 credits. Program to be announced. Sunil Bald

1199b, Thesis 9 credits. Proposals for the Thesis option must be submitted for review and approval by the Design and Rules Committees by the Friday of Jury Week for the preceding spring term. Proposals must include an abstract, a proposal, a bibliography, a proposed schedule and adviser, a methodology statement, and the student's current portfolio. Students with approved proposals can take an Independent Study with an instructor of choice in the fall term as thesis preparation. Keller Easterling, coordinator

Elective Courses

1211a, Drawing and Architectural Form (formerly 803a) 3 credits. This course examines the highly rigorous constructed architectural drawing through the tools of descriptive geometry, cast perspective, and sciagraphy. These tools have evolved within an historical and theoretical context of architectural representation, and can inform strategies toward the conception of architectural form. The drawing process of the constructed drawing reveals the building through the tactile materials of its own construction. Thus, mediums such as pencil, ink washes, and watercolor are an integral part of the articulation of these drawings. The appropriateness and meaning of drawn construction and its

articulation are examined through a series of drawn investigations, which use the Yale campus as a point of departure. Limited enrollment. Victor Agran

1212b, Classical Drawing (formerly 811b) 3 credits. This seminar teaches advanced representational skills through the study of classical architectural forms. Both traditional and contemporary graphic techniques (watercolor on pencil, and computer modeling and rendering) are explored. Classical drawing skills are acquired through a series of graphic exercises that also provide an understanding of the parts of which classical architecture are made and how they are put together into meaningful wholes. Exercises include rigorous full-color measured drawings of outstanding examples of Western classical architecture. The final exercise has a small design component. Lectures and readings address related topics, such as beauty, order, symmetry, hierarchy, proportion, ornament, and meaning. AutoCAD proficiency is recommended. Limited enrollment. Dino Marcantonio, Paloma Pajares

1213a, Architecture and Books (formerly 858a) 3 credits. For architects, the book has been a necessary (if not essential) tool for clarifying, extending, and promoting their ideas and projects. This seminar examines the phenomenon of the book in architecture as both an array of organizational techniques (what it is) and as a mediator (what it does). Arguably, outside of building itself, the book has been the preferred mode of discourse that architects have chosen to express their intellectual project. Because lasting impression relies partially upon durability of message, the book remains the objet par excellence among media. In addition, the book finds itself in a privileged position as an instrument of discourse. Despite claims that the book is an antiquated tool among an expanding world of media alternatives, it is exactly the book's resistance, weight, displacement, its old-fashionedness, that seems to safeguard its value as an instrument of thought. Through case studies, the first portion of this seminar examines the relationship book production has with a selection of contemporary and historical practices, including each project's physical and conceptual composition as well as how each project acts as an agent of the architect within a larger world of communication. The second part of the seminar asks students to apply ideas gathered to a book

project of their own. Limited enrollment. Luke Bulman

1214a, Architectural Form (formerly 780a) 3 credits. The seminar explores the issue of Formalism as defined by writers, artists, and architects after World War II. Topics include Minimalism, Neo-Constructivism, Deconstructivism, neo-organicism, field theory, and the political aspects of form. Readings include Adorno, Greenberg, Krauss, Eisenman, Smithson, Morris, Wigley, Kipnis, and Allen. Students are expected to formulate a formal thesis in written form by curating an exhibit and writing a catalogue that justifies their choices in terms of both technique and effect. Limited enrollment. Edward Mitchell

1215b, Inner Worlds: Geometries of the Interior 3 credits. Since the eighteenth century, the architectural interior has been directly associated with subjectivity; an inner world bound up with psychological content—moods, sensations, and affects. After the exterior-izing treatments of universal space and the banality of Junk Space, architects interested in a post-linguistic set of effects or constrained by tighter economic conditions are reconsidering the potential of interior as a carefully curated alternate universe. Often left underdeveloped or unconsidered by architects, the design of the interior is peripheral to logics of construction, organization, and urbanism. This seminar attempts to establish a set of criteria with which to approach the design of interior spaces, by examining interior effects produced by “exterior” settings and media (photography, painting, film, and design). Speculations on the contemporary interior are developed in the context of material and geometry—by working with specific materials and processes of cutting, carving, and assembly at 1:1 scale. Students exploit the inherent complexity of material fabrication to develop full-scale interior surfaces that produce specific and richly affective interior environments. Limited enrollment. Brennan Buck

1216b, Ornament Theory and Design (formerly 751b) 3 credits. This course reviews the major theories governing ornament in Western architecture, with special emphasis on nineteenth- and twentieth-century arguments. The ultimate focus is on the language of ornament in the framework of building and urban

space today. Readings, exercises, and individual final projects are required. Limited enrollment. Kent Bloomer and visitors

1217a, Architectural Product Design (formerly 674a) 3 credits. This studio course attempts to broaden the design experience by concentrating on the design and innovation of three-dimensional architectural objects not usually found within architectural commissions. Students are required to design and fabricate full-size, working prototypes of five small objects such as weather vanes, andirons, step stools, mailboxes, bird houses, etc. Emphasis is on wood and metal, but all materials are considered. Issues of detail, scale, proportion, aesthetics, manufacturing, and commercial viability are explored. Limited enrollment. John Jacobson, Lindsay Suter

1218b, Furniture Design and Fabrication (formerly 681b) 3 credits. The final product of this design class, a finished, working, full-scale piece of furniture, is understood as a part of the set of courses addressing the role that the direct consideration of materials contributes to architectural design. The required materials, sequences, and programs emerge from an effort to relate the work of this class to questions of process and materiality in architecture more generally. So the attitude toward materials and their assembly should be prejudiced toward those that to some extent mimic architecture. The emphasis is on common materials joined and formed by standard procedures to serve unique purposes in unusual contexts and adapted to new programs. Prerequisite: 1015a or permission of instructor. Limited enrollment. Peter de Bretteville

1220a, On the Face of It: Fabrication and Façade 3 credits. This seminar examines the re-emerging concern with architectural representation through the discourse of geometry and computation. The building facade is the site of both performance (structural, environmental, and organizational) and politics (transparency, permeability, and fenestration). It orchestrates the building's spatial relationships as well as engages with its social context. This seminar proposes that as architects have begun to engage with hands-on information processing, a set of sensibilities have simultaneously emerged that open up

alternate modes of faciality. The dense pattern and expressed joints common to many contemporary building skins perform at multiple scales and orientations beyond front-to-back or top-to-bottom. Geometries of aggregation produce relationships between the part and the whole, the one and the many, the individual and larger social structures. Initially, the contemporary state of the façade is established by examining its historical evolution and associated meanings in relation to theories of perception, faciality, and assemblage. Students are asked to delve deeply into the formal potential of the Grasshopper scripting interface (tutorials and consultation throughout the semester are provided—no experience or particular software facility is necessary) and to engage with the theoretical content discussed. Students design façade systems that synthesize surface geometry, panelization, structure, and fenestration. Each student's project must articulate an agenda about inside and out, material and assembly, affect and representation. Limited enrollment. Brennan Buck

1221b, Making Sense: Space, Technology, and the Body (formerly 783b) 3 credits. Challenging our traditional “ocularcentric” understanding of architecture, this seminar explores the overlapping relationship among sight, sound, and touch. Seminar discussions based on required readings treat this subject from a socio-historical perspective, examining how prevailing cultural assumptions about the human body shape and in turn are shaped by the design of the built environment. The seminar considers the impact of technology on the senses. Since the nineteenth century, new inventions—from gramophones to iPods—have transformed the human sensorium, profoundly altering how we perceive and interact with the designed environment. After charting these historical developments, the seminar speculates about the future: How can architects harness new materials and technologies to craft new ways of synthesizing multi-sensory experiences in space? How can we devise new representational strategies that convincingly portray our sensory experience of space? Limited enrollment. Joel Sanders

1222b, Diagrammatic Analysis: Criticality after the Index (formerly 786b) 3 credits. While formal analysis is sufficient to understand the genesis of historical

buildings up until the French Revolution, that approach is no longer sufficient to understand the complexity of contemporary work, which, despite formal moments, introduces new relationships. This seminar is intended to explore analytic methods that provide an understanding of the complexities of current architectural production. The seminar begins with discussions of new material practices and relationships to the production of form. Students are required to make a presentation, whether it be drawings, writing, or animation, of a diagrammatic analysis of a recent building, such as the Seattle Public Library by Koolhaas, his Porto Concert Hall, Herzog and de Meuron's de Young Museum, Zaha Hadid's Rome Market project, or Zaera Polo's Yokohama Harbor Project. Limited enrollment. Peter Eisenman

[1223b, In Pursuit of Modern Form (formerly 790b) 3 credits. The seminar surveys theories about the genesis and meaning of modern form put forward by architects and theorists during the early part of the twentieth century. The focus is on what it means to be modern and what constitutes a modern form. The seminar considers different design methods and formal theories that aimed to take into account issues central to modernity, such as dynamism, mobility, internationalism, geopolitics, and new types of experience. Students study texts and works by key architects and theorists who engaged this debate, such as Alvar Aalto, Hans Arp, Adolf Behne, Le Corbusier, Siegfried Ebeling, Naum Gabo, Jean Marie Guyau, Hugo Häring, El Lissitzky, László Moholy-Nagy, Antonio Sant'Elia, Filippo Thommaso Marinetti, Mies van der Rohe, and Henry de Velde. Key artistic and philosophical ideas, such as elementarism, futurism, functionalism, vitalism, constructivism, and biocentrism are addressed. Students produce a research Web site, which allows comparison and cross-referencing between different theories. Limited enrollment. Not offered in 2009–2010. Eeva-Liisa Pelkonen]

1224a, The Chair 3 credits. The chair has been a crucible for architectural ideas and their design throughout the trajectory of modern architecture. The chair is both a model for understanding architecture and a laboratory for the concise expression of idea, material, fabrication, and form. As individual as their authors, the chair provides a medium that is a controllable minimum structure, ripe for

material and conceptual experiments. In this seminar, students develop their design and fabrication skills through exploration of the conceptual, aesthetic, and structural issues involved in the design and construction of a full-scale prototype chair. Limited enrollment. Timothy Newton, Joshua Rowley

1291c, Rome: Continuity and Change (formerly 791c) 3 credits. (Open only to M.Arch. I second-year and M.Arch. II first-year students.) This intensive four-week summer workshop takes place in Rome and is designed to provide a broad overview of that city's major architectural sites, topography, and systems of urban organization. Examples from antiquity to the twentieth century are studied as part of the context of an ever-changing city with its sequence of layered accretions. The seminar examines historical continuity and change as well as the ways in which and the reasons why some elements and approaches were maintained over time and others abandoned. Drawing is used as a primary tool of discovery during explorations of buildings, landscapes, and gardens, both within and outside the city. Students devote the final week to an intensive independent analysis of a building or place. M.Arch. I students are eligible to enroll in this course after completing at least three terms. The course requires an additional tuition charge. Limited enrollment. Stephen Harby, Alexander Purves

1299a or b, Independent Course Work 3 or 6 credits. Program to be determined with a faculty adviser of the student's choice and submitted, with the endorsement of the study area coordinator, to the Rules Committee for confirmation of the student's eligibility under the rules. (See the School's *Academic Rules and Regulations*.)

The following courses offered elsewhere in the University may be taken for credit with permission of the instructor.

Art 111a or b, Visual Thinking An introduction to the language of visual expression, using studio projects to explore the fundamental principles of visual art. Students acquire a working knowledge of visual syntax applicable to the study of art history and popular culture, as well as art. Projects address all four major concentrations (graphic design, painting/printmaking, photography,

sculpture). No prior drawing experience necessary. Materials fee: \$25. Anna Betbeze, Elke Lehman, and faculty

Art 114a or b, Basic Drawing An introduction to drawing, emphasizing articulation of space and pictorial syntax. Class work is based on observational study. Assigned projects address fundamental technical and conceptual problems suggested by historical and recent artistic practice. No prior drawing experience necessary. Materials fee: \$25. Anna Betbeze, Marie Lorenz, Sam Messer, Robert J. Reed, Jr., Robert Storr, and faculty

Art 116a, Color Study of the interaction of color, ranging from fundamental problem solving to individually initiated expression. The collage process is used for most class assignments. Materials fee: \$25. Clint Jukkala

Art 120a or b, Introductory Sculpture Exploration of the range of sculpture. Topics include current genres and issues in contemporary sculpture. Attention to understanding and articulating formal structure, both physical and conceptual. Group discussion complements the studio work. The shops and studio are available during days and evenings throughout the week. Enrollment limited to twelve. Materials fee: \$75. Scott Braun and faculty

Art 130a or b, Painting Basics An introduction to basic painting issues, including the conventions of pictorial space and the language of color. Class assignments and individual projects explore technical, conceptual, and historical issues central to the language of painting. Materials fee: \$75. George Rush [F] and Anna Betbeze [Sp]

Art 132a or b, Introductory Graphic Design A studio introduction to visual communication with an emphasis on visual organization of design elements as a means to transmit meaning and values. Topics include shape, color, visual hierarchy, word-image relationships, and typography. Development of a verbal and visual vocabulary to discuss and critique the designed world. Materials fee: \$150. Julian Bittiner and Henk van Assen

Art 210b, Sculpture as Object Introduction to concepts of design and form in sculpture. The use of wood, including both modern and traditional methods of carving, lamination, assemblage, and finishing. Fundamentals of metal processes such as welding, cutting, grinding, and finishing may be explored on a limited basis. Group discussion complements the studio work. The shops and studio are available during days and evenings throughout the week. Enrollment limited to twelve. Materials fee: \$75. Scott Braun

Art 345a or b, Intermediate Sculpture Further investigation into the history of sculpture and questions pertinent to contemporary art. Exploration of new techniques and materials along with refinement of familiar skills. Focus on helping students become self-directed in their work. Individual and group discussion and visits to museums and galleries. Enrollment limited to twelve. Materials fee: \$75. Prerequisite: Art 120a or b or equivalent, or permission of instructor. Scott Braun and faculty

Art 355b, Silkscreen Printing This course presents a range of techniques in silkscreen and photo-silkscreen, from handcut stencils to prints using four-color separation. Students create individual projects in a workshop environment. Materials fee: \$150. Prerequisite: Art 114a or b or equivalent. Open to graduate students. Marie Lorenz

Art 356a, Printmaking I Instruction in a diverse range of printmaking media. Students develop work in linocut, woodcut, collograph, drypoint, and etching. Methods in both color and black and white printing. Materials fee: \$150. Prerequisite: Art 114a or b or equivalent. Marie Lorenz

[Art 359b, Lithography Basic techniques of stone and plate lithography. Students create prints utilizing drawing and/or photo-based imagery. It is recommended that students have a basic knowledge of Photoshop. Materials fee: \$150. Prerequisite: Art 114a or b or equivalent. Not offered in 2009–2010]

Sculpture 448a, Sculpture and Questions of Definition A studio seminar that considers the nature of sculpture. The conventional definition of sculpture (being

concerned with volume and mass in space) scrutinized in view of artwork that falls out of other categories into “sculpture.” Student work considered in the context of conventional categories of sculpture, painting, graphic design, and photography. Art’s responsiveness to its context and questions of authorship, process, and vulnerability. Jessica Stockholder

DRAM 102a/b, Scene Design An introduction for all non-design students to the aesthetics and the process of scenic design through critique and discussion of weekly projects. Emphasis is given to the examination of the text and the action of the play, the formulation of design ideas, the visual expression of the ideas, and especially the collaboration with directors and all other designers. Three hours a week. Open to nondepartmental students. Ming Cho Lee, Michael Yeargan

F&ES 77001a/ARCG 762a/G&G 562a, Remote Sensing of the Earth from Space 3 credits. Course topics include the spectrum of electromagnetic radiation, satellite-borne radiometers, data transmission and storage, computer image analysis, and merging satellite imagery with GIS. Applications to weather and climate, oceanography, surficial geology, ecology and epidemiology, forestry, agriculture, and watershed management. Preference to students in F&ES, Geology and Geophysics, Epidemiology, Anthropology, and Studies in the Environment. Prerequisites: college-level physics or chemistry, two courses in geology and natural science of the environment or equivalents, and computer literacy. Ronald B. Smith, Xuhui Lee, Mark S. Ashton, Karen Seto

F&ES 77010b, Modeling Geographic Space 3 credits. An introduction to the conventions and capabilities of image-based (raster) geographic information systems (GIS) for the analysis and synthesis of spatial patterns and processes. In contrast to F&ES 77011a, the course is oriented more toward the qualities of geographic space itself (e.g., proximity, density, or interspersion) than the discrete objects that may occupy such space (e.g., water bodies, land parcels, or structures). Three hours lecture, problem sets, one class project. No previous experience is required. Dana Tomlin

F&ES 77011a, Modeling Geographic Objects 3 credits. This course offers a broad and practical introduction to the nature and use of drawing-based (vector) geographic information systems (GIS) for the preparation, interpretation, and presentation of digital cartographic data. In contrast to F&ES 77010b, the course is oriented more toward discrete objects in geographical space (e.g., water bodies, land parcels, or structures) than the qualities of that space itself (e.g., proximity, density, or interspersion). Three hours lecture, problem sets, one class project. No previous experience is required. Dana Tomlin

TECHNOLOGY AND PRACTICE

Michelle Addington and Kyoung Sun Moon, Study Area Coordinators

This study area explores fundamental theories and methods of building technologies and the relationships among these technologies, architectural design, and the larger natural environment. Courses examine materials, construction, structural systems, and the environmental technologies that provide healthy, productive, sustainable, and comfortable environments. This area also covers professional practice and examines the relationship between methods of construction, procurement, and management. Advanced courses investigate specific technical systems in greater detail, survey emerging methods and technologies, and explore the relationship between building technologies and architectural design in current practice and writings.

For the M.Arch. I program, requirements in this study area include six courses that survey common technical systems used in buildings and integrate the consideration of these technical systems into architectural design through a series of projects of increasing complexity. In addition, there is a required course on architectural practice.

Required Courses

2011a, Structures I (formerly 601a) 3 credits. (Required in M.Arch. I first year, fall term.) An introduction to the analysis and design of building structural systems and the evolution and impact of these systems on architectural form.

Lectures and homework assignments cover structural classifications, fundamental principles of mechanics, computational methods, and the behavior and case studies of truss, cable, arch, and simple framework systems. Discussion sections explore the applications of structural theory to the design of wood and steel systems for gravity loads through laboratory and computational exercises and design projects. Homework, design projects, and midterm and final examinations are required. Kyoung Sun Moon

2012b, Structures II (formerly 602b) 3 credits. (Required in M.Arch. I first year, spring term.) This course is a continuation of introductory analysis and design of building structural systems. The course introduces materials and design methods of timber, steel, and reinforced concrete. Structural behavior, ductility concepts, movement, and failure modes are emphasized. Geometric properties of structural shapes, resistances to stresses, serviceability, column analysis, stability, seismic, wind load, and lateral force resisting systems are presented. Homework involves calculations, descriptive analysis, and the building and testing of structural models. Midterm and final examinations are required. Prerequisite: 2011a. Kyoung Sun Moon

2014b, Climate and Site 1.5 credits. (Required in M.Arch. I first-year, spring term.) This course, taught over the first seven weeks of the spring term, is made up of two modules that address external parameters affecting the design of buildings. The first module introduces students to the physical fundamentals of climate and the basic principles of climatic building design. The second module examines the various ways that site affects the approach to building conception and construction. Each module includes exercises that students are expected to conduct in and out of the class time. Michelle Addington, Kathleen John-Alder

2015b, Building Technology 1.5 credits. (Required in M.Arch. I first-year, second half of spring term.) This course, taught over the final five weeks of the spring term following 1014b, addresses materials and methods of building assembly with a focus on the integrated design of various systems of structure and enclosure. Like 1014b, it examines conditions essential to a building's logic

regardless of program, form, and style. This course includes exercises that students are expected to conduct in and out of the class time. Alan Organschi

2021a, Environmental Design (formerly 633a) 3 credits. (Required in M.Arch I second year, fall term.) This course examines the fundamental scientific principles governing the thermal, luminous, and acoustic environments of buildings, and introduces students to the methods and technologies for creating and controlling the interior environment. Beginning with an overview of the Laws of Thermodynamics and the principles of Heat Transfer, the course investigates the application of these principles in the determination of building behavior, and explores the design variables, including climate, for mitigating that behavior. The basic characteristics of HVAC systems are discussed, as are alternative systems such as natural ventilation. The second half of the term draws on the basic laws of physics for optics and sound and examines the application of these laws in creating the visual and auditory environments of a building. Material properties are explored in detail, and students are exposed to the various technologies for producing and controlling light, from daylighting to fiber optics. The overarching premise of the course is that the understanding and application of the physical principles by the architect must respond to and address the larger issues surrounding energy and the environment at multiple scales and in domains beyond a single building. The course is presented in a lecture format. Homework, computational labs, design projects, short quizzes, and a final exam are required.
Michelle Addington

2022b, Systems Integration and Development in Design (formerly 648b) 3 credits. (Required in M.Arch. I second year, spring term.) This course is an integrated workshop and lecture series in which students develop the technical systems of preliminary design proposals from earlier studio work. The careful advancement of structural form and detail, environmental systems, and envelope design, as well as an understanding of the constructive processes from which a building emerges, are all approached systematically, as elements of design used not only to achieve technical and performance goals but also to reinforce and re-inform the conceptual origins of the work. The workshop is complemented by a

series of lectures from leading structural, environmental, and envelope consultants. Detailed technical drawings and analyses are required. Martin Finio, coordinator; Steven Baumgartner, Nikolas Dando-Haensch, Kenneth Gible, Erleen Hatfield, Robert Haughney, Kristin Hawkins, John Jacobson, Andrew Marchesin, Kyoung Sun Moon, Craig Razza, Edward Stanley, Barry Svigals, Shanta Tucker, Laura Turlington

2031a, Architectural Practice and Management (formerly 655a) 3 credits.

(Required in, and limited to, M.Arch. I third year, spring term. No waivers allowed.) The process by which an architectural design becomes a building requires the designer to control many variables beyond the purely aesthetic. This course provides an understanding of the fundamentals of organizing and managing architectural projects and examines accompanying issues of practice and the profession. Using the project process as an armature, lectures explore the role and function of the architect, the legal environment, evolving types of practice, fees and compensation, building project teams, and planning and executing a project. Phillip Bernstein

Elective Courses

2211a, Structures and Façades for Tall Buildings (formerly 618a) 3 credits.

This seminar investigates the dynamic interrelationship between technology and architecture in tall buildings. Among the various technologies involved, emphasis is placed on structural and façade systems, recognizing the significance of these systems, the separation of which in terms of their function led to modern architecture, and allowed the emergence of tall buildings. This seminar reviews contemporary design practice of tall buildings through a series of lectures and case study analyses. While most representative structural and façade systems for tall buildings are studied, particular emphasis is placed on more recent trends such as diagrid structures and double skin facades. Further, this seminar investigates emerging technologies for tall buildings and explores their architectural potentials. Finally, this course culminates in a tall building design project and presentation. Limited enrollment. Kyoung Sun Moon

[2212a, The Liquid Threshold between Order and Chaos (formerly 625a) 3 credits. This seminar explores the fine line of equilibrium between what makes a structure work and what causes collapse. How do you know a structure is at its limit without witnessing failure? With this challenge, students test the design and destruction (making and breaking) of simple two-dimensional elements refined to their optimum to resist compression, tension, shear, and bending. After exploring the failure mechanisms of simple elements, the seminar investigates three-dimensional systems and the benefit of structural form. The course combines class discussions and workshops to examine a series of projects (including some of the instructors' own) in which failure is imminent or has occurred. Through this discussion, the class explores where structures are vulnerable and how they can be enhanced. Limited enrollment. Not offered in 2009–2010. Neil Thomas, Aran Chadwick]

2213a, Sustainable Design: Larger Issues and Detailed Methods (formerly 636a) 3 credits. This seminar looks broadly at sustainable architectural and urban design, reviewing the current state of the global environment, the key historical documents of the sustainable revolution, and the guiding principles of sustainable design. Then more narrowly, the seminar examines detailed methods used to support design development of larger-scale built environments, cities, communities, and buildings. Devised to complement 2021a, Environmental Design, this seminar explores scales larger and smaller than the single building by considering guidelines for and case studies of innovative community, urban, and regional-scale strategies of sustainable design. The seminar surveys recent sustainable design assessment methods, design guidelines, and international standards and considers case studies of innovative buildings shaped by these methods. To ground these methods in reality, students apply the principles and methods to a green urban design project. Limited enrollment. Naomi Darling

2214b, Performance of Architecture: Paradigms of Enclosure and Shade 3 credits. Design attitudes toward enclosure and its performance, especially methods for making shade, have radically shifted over the last twenty years because of social, cultural, and economic conditions. Sustainability issues have

also recast building enclosure strategies. This seminar examines the history of enclosure systems design throughout the twentieth century and questions new modes of design, production, and performance as they are emerging in twenty-first-century practice. Each week is devoted to examining paradigms of shading, from vernacular forms to brise-soleils. Each week is devoted to a discussion of selected readings and a presentation of projects from Neutra, Wright, Le Corbusier, Drew and Fry, the Smithsons, and Kahn, as well as to contemporaries such as SANNA, Herzog & de Meuron, FOA, UN Studios, R&Sie(n), Ishigami, and Aravena. Students are expected to present two short visual presentations and develop a semester-long project that either assumes the form of an original design project or a dense research presentation. Limited enrollment. Hilary Sample

[2215b, Architecture as Building (formerly 640b) 3 credits. This course analyzes the major buildings of this century through detailed dissection of their methods of construction. Graphic display of the major systems that make up a contemporary work of architecture allows for a reconstruction of the design process and re-establishes the thought patterns that formed the design priorities. Emphasis is on the relation of systems of structure and enclosure with the required technical systems. Limited enrollment. Not offered in 2009–2010. Thomas Beeby]

2216b, Materials and Meaning (formerly 678b) 3 credits. This seminar focuses on the potential for meaning in the use of materials through specifications, context, detailing, juxtaposition, and history. Special attention is paid to readily available manufactured products. Weekly readings, one class presentation, and two built projects are required. Limited enrollment. Deborah Berke

2217a, Material Formation in Design (formerly 665a) 3 credits. This course presents historical, contemporary, and emerging methods of material formation from a designer's perspective. Emphasis is placed on those processes especially useful for custom architectural fabrication, enabling students to capitalize on the opportunities generated by computer-aided design and manufacturing

(CAD/CAM). As the term progresses, component design and fabrication project assignments feature increasingly complex 3-D geometries. Students choose from a variety of 3-D modeling programs and use these in conjunction with conventional sketch-based ideation to create their designs. Students then fabricate their projects using the School's wide array of computer-numerically controlled (CNC) additive and subtractive material forming equipment. Limited enrollment. Kevin Rotheroe

[2218b, Smart Materials (formerly 684b) 3 credits. This seminar explores the basic characteristics and families of smart materials, with a special focus on materials and technologies that have a relationship to vision. The course examines, in depth, materials and technologies such as LEDs, smart glazing, displays and interactive surfaces, and explores some of the contemporary experiments taking place in the architectural profession. Each student is required to coherently discuss material fundamentals and comprehensively analyze current applications. The course culminates with each student focusing on a material characteristic with which to explore different means of technology transfer in order to begin to invent unprecedented approaches. There are several exploratory assignments and a final design experiment. Limited enrollment. Not offered in 2009–2010. Michelle Addington]

2219b, Craft, Materials, and Computer-Aided Artistry (formerly 667b) 3 credits. This course reviews materials and computer-aided manufacturing (CAM) processes especially suited for digitally crafting inspired and unique architectural components. Students use 3-D modeling programs, including a digital environment that mimics carving actual materials, and then translate their designs into tangible prototypes using a wide range of CAM equipment. Required projects feature increasingly complex geometry as the course progresses. Limited enrollment. Kevin Rotheroe

2220a, Studies in Light and Materials (formerly 693a) 3 credits. Lighting is by far the single largest consumer of electricity in the United States. As a result, the majority of “green” guidelines for building design call for an increase in the use of

daylight. The incorporation of daylight into buildings has tended to be problematic—bringing large heat gains and thermal swings at the building envelope and, in many cases, requiring more artificial illumination to offset the high contrasts. If we could begin to respond to and interact with the transient and specific behavior of daylight, rather than asking daylight to act as a direct substitute for electrical lighting, then we may be able to enhance the human visual experience while significantly reducing energy usage. This seminar examines the physics and behavior of daylight. New materials and technologies, such as light pipes, light directing films, fiber optics, and the “smart” chromagenics, are considered; and simulation tools are used for analysis. In addition, advances in discrete electrical lighting technologies, including LEDs and many luminescing materials, are examined. Students are asked to build—physically and/or virtually—installations that manipulate the properties and behavior of light and daylight. Limited enrollment. Michelle Addington

2221b, Ornament and Technology (formerly 688b) 3 credits. This course examines contemporary interests in digital fabrication relative to the historically complex relationship between technology and the production of ornament and decoration. The seminar surveys the history of ornament from 1851 to the present in order to identify various, and often conflicting, definitions of the term and to examine a series of diverse case studies. The intention is to outline the potential for digital fabrication to contribute to renewed considerations of the decorative in contemporary architecture, by exploring strategies of figuration, organization, and technique to which these technologies can be readily applied. The course begins with a series of weekly readings, presentations, and case study analyses, and culminates in a final design project and presentation. Limited enrollment. Ben Pell

2224b, Issues in Contemporary Practice (formerly 657b) 3 credits. This course, in weekly seminars with practitioners from architecture and related fields, addresses the broad view of practice beyond core design and the practicalities of running architectural projects. Topics discussed answer such questions as what firms look for when they hire recent graduates; how clients

select architects; how architects find commissions; how projects get publicized and published; what are the keys to selecting and working with good collaborators like engineers, consultants, and contractors; how to start your own practice; and how to work with owners and developers. Limited enrollment, available only to graduating M.Arch. I and M.Arch. II students. John Apicella, Phillip Bernstein

[2225a, Opulence and Excess: The Architecture of Techno-Romanticism

(formerly 776a) 3 credits. This seminar posits that during the past decade digitally produced architecture based on geometric, mapping, and performance-based ambitions has failed to yield the intended results. Instead of relying on these architectural fictions for legitimacy, this seminar examines the emerging interest in formal aesthetics and beauty as vehicles by which architecture can seek to critically engage a new and vibrantly altered twenty-first-century cultural context. As a historic background, the seminar examines the aesthetic debates of the late eighteenth-century transition from Enlightenment to Romantic visual sensibilities. Historic and contemporary texts are used and include the writings of Herder, Berlin, Kant, Zangwill, Lavin, and Kipnis. Similar new romantic sensibilities that are emerging in motion graphics, industrial design, the automotive industry, advertising, fashion, typography, and culinary culture are enlisted to inform student work. A series of experimental formal projects are given that use both digital and material techniques of production. Limited enrollment. Not offered in 2009–2010. Mark Foster Gage]

2226a, Design Computation 3 credits. There has always been a direct relationship between architects' tools and the qualities of space those tools produce. Computational machines, once considered just more efficient versions of paper-based media, now have a demonstrated, speculative form-making potential. Design computation encapsulates this potential as a collection of systems that can activate the object of design with behaviors, rules, and self-generating processes. Architecture is still developing critical frameworks to value these processes; but for computation to be most effective in creating new architectures, architects must invent their own systems for design computation

rather than relying only on those created by other fields for different priorities. This seminar explores generative form-making, programming, and computational geometry, enabling students to interrogate the analytical, diagrammatic, and speculative methodologies of design computation with respect to architecture and form. Topics include multi-agent systems, cellular automata, flocking behavior, algorithms, dynamic form, and Lindenmayer systems. This course considers them not as mere programming techniques, but as analytic and exploratory tools for responsible design. The work culminates in an interactive final project that challenges the understanding of computation in architecture. Limited enrollment. William Martin

2227a, Design and Disease: New Typologies (formerly 779a) 3 credits. This seminar focuses on the complex intersection between design and disease. There is a particular kind of reciprocity between public health and public space that shaped the modern and contemporary city. This seminar approaches the history of design, architecture, and technology through a close reading of select models of architecture, propositions for cities, infrastructures, and manifestos. It aims to encourage students to reflect upon innovative building types and unusual design objects, such as hospitals, sanatoriums, rehabilitation centers, research facilities, teen centers, homeless shelters, and health clinics that developed out of the urgency of urban health crises—from disease to war—from the 1850s to the present. Each session is devoted to an in-depth study of an architect and paradigms of the intertwining of health, architecture, technology, social theories, culture, and urbanism. Architects explored include Le Corbusier, Alison and Peter Smithson, Archigram, Louis Kahn, Tecton, Otto Wagner, Alvar Aalto, Buckminster Fuller, Jane Drew, Gustav Peichl, Erich Mendelsohn, and contemporaries such as Rem Koolhaas and Herzog & de Meuron. Students are expected make a short visual presentation and develop an original semester-long project that assumes the form either of a design project or of a research paper. Limited enrollment. Hilary Sample

2299a or b, Independent Course Work 3 or 6 credits. Program to be determined with a faculty adviser of the student's choice and submitted, with the

endorsement of the study area coordinators, to the Rules Committee for confirmation of the student's eligibility under the rules. (See the School's *Academic Rules and Regulations*.)

The following courses offered elsewhere in the University may be taken for credit with permission of the instructor.

DRAM 109a/b, Structural Design for the Stage This course concurrently develops the precalculus mathematics and physical sciences requisite for advanced study in modern theater technology, and concentrates on the application of statics to the design of safe scenic structures. Assignments relate basic principles to production applications. Two hours a week. Open to nondepartmental students with permission of the instructor. Bronislaw Sammler

DRAM 389a, Properties Design and Construction Through lectures and demonstrations, students study design and fabrication of stage properties. Assignments encourage students to develop craft skills and to explore the application of traditional and new techniques to production practice. Three hours a week. Open to nondepartmental students with permission of the instructor. Hunter Spence

ECON 737au, Economics of Natural Resources Linking of abstract economic concepts to concrete policy and management decisions. Application of theoretical tools of economics to global warming, pollution control, fisheries, forestry, recreation, and mining. Robert Mendelsohn

F&ES 40004a, Archetypes and the Environment 3 credits. This course explores the mythologies, literatures, arts, and folklore of a variety of cultures in search of archetypal characters whose role is to mediate between nature and society. Beginning with sources as early as *The Epic of Gilgamesh* and ending with contemporary film and media, the course seeks to examine and understand the ways in which diverse peoples integrate an awareness of their traditional and popular arts and cultures. The course makes use of works from a variety of languages, including Akkadian, Greek, Tibetan, Bhutanese, Chinese, German,

French, and Italian, but all readings are available in English; students with reading abilities in foreign languages will be encouraged to examine primary sources wherever possible. The course includes visits to the Beinecke Rare Book and Manuscript Library, the Yale Center for British Art, and the Yale Art Gallery. Three hours lecture/discussion. Paul A. Draghi

F&ES 50104b, Seminar in Ecological Restoration 3 credits. The purpose of this course is to summarize theoretical and practical ecological knowledge on how to restore or rehabilitate degraded landscapes. Degraded landscapes usually exist in a complex mosaic that is constantly changing. Each of these conditions has characteristics that must be taken into account when developing restoration strategies. Topics include: Concepts and principles of ecological restoration. Types of disturbances, forest succession, and ecosystem rehabilitation. Soil formation and development. Strategies for rehabilitation of soil's physical and chemical properties. Plantations as catalysts of forest succession in degraded landscapes. Agroforestry systems as a tool for recovery and conservation of biodiversity in managed landscapes. Biological and economic enrichment of overlogged and secondary forests. Mechanisms of pasture degradation and techniques to aid in pasture sustainability. Reforestation of degraded lands: productivity and preferences by farmers. Reclamation of mine spoils. Restoration of inland and coastal wetlands. Techniques to control invasive species. Reclamation after fire. Who does restoration? Community participation and challenges to implementation of restoration projects. Monitoring and evaluation of restoration projects. In addition, seminar presentations by visitors and students and discussion sessions deal with particular aspects of restoration. Prerequisite: F&ES 32007a or 32006a, or equivalent (check with instructor). Three hours lecture per week, three field trips. Florencia Montagnini

F&ES 52012a, Global Resources and the Environment 3 credits. The world's climate, soils, water, plant and animal species, mineral and organic resources, and people are neither equally nor randomly distributed throughout the earth; each has changed and will continue to change. Both the distribution and change can be understood (at least to some extent) based on "uniform processes" that

occur repeatedly throughout the world. Policies, investments, and on-the-ground management will be effective if the experts understand the global situation. And students can better understand behaviors of one aspect of the environment at one location if they have a global overview of many aspects and their behaviors and interactions. The course is intended to give students (1) an understanding of the present global distribution and changes with time of the resources, people, and other factors including climates, geomorphic areas, water, species, human communities and populations, agriculture, forest products, inorganic commodities, and energy, (2) an understanding of how to access and utilize information on global resources, (3) an understanding of important issues and management approaches, including species protection and extinctions, resource depletion and sustainability, catastrophic events, soil and water maintenance and degradation, atmospheric change and carbon sequestration, populations and life styles, resource substitution and economics, consumption, recycling, and substitution patterns and potential changes (through lectures, readings, analyses, and case studies). Chadwick D. Oliver

F&ES 80029a, Local Environmental Law and Land Use Practices 3 credits. This course explores the regulation by local governments of land uses in urban and watershed areas and the effect of development on the natural environment. The course helps students understand, in a practical way, how the environment can be protected through effective regulation at the local level. It introduces students to federal, state, and regional laws and programs that affect watershed protection and to the laws that delegate to local governments primary responsibility for decision making in the land use field. Theories of federalism, regionalism, states' rights, and localism are studied. The history of the delegation of planning and land use authority to local governments is traced, leading to an examination of local land use practices particularly as they relate to controlling development in and around watershed areas. Course participants engage in empirical research working to identify, catalogue, and evaluate innovative local laws that successfully protect environmental functions and natural resources, and the manner in which towns, particularly on the coast, incorporate climate change

into their planning and regulations. Nearby watersheds are used as a context for the students' understanding of the strengths and weaknesses of local planning and regulation. Attention is paid, in detail, to how the development of the land adversely affects natural resources and how these impacts can be mitigated through local environmental regulations. The course includes examination of the state and local response to climate change, sea level rise, growth management, alternatives to Euclidean zoning, low-impact development, brownfields, and other innovative land use strategies. Marjorie Shansky

F&ES 90025b/SOCY 535b, Consumption and Sustainability 3 credits. This course addresses the role of consumption in achieving sustainability, considering challenges such as the scale of consumption in the global north, the adoption of high-impact life styles in the global south, and the role of particular high-impact goods and services. The subtext of much of the discussion to date has been about how difficult it is to affect the trajectory and composition of consumption. However, a look at the historical path of consumer cultures reveals that they are dynamic, multifaceted, and complex entities, with numerous possibilities for transformation. The course begins with the socio-cultural approach to consumer culture, and particularly the work of Pierre Bourdieu. We also consider the consumption and identity, the global expansion of consumer culture, and the literature on habit and routine. In the second section of the course we look at the ecologically significant cases of food, energy, and life style, and consider developments such as the slow food movement, personal carbon trading allowances, downshifting, and cultural conflicts about energy use and vehicles (hybrids vs. Hummers). The final section is on the politics of sustainable consumption, and the movement for ethical, or ecologically responsible, consumption. The course develops basic fluency in the rapidly growing field of sustainable consumption, with an emphasis on the major paradigms. Juliet Schor

F&ES 90108b, Advanced Industrial Ecology Seminar 3 credits. This research seminar pursues state-of-the-art investigation of inter-firm resource sharing in developing countries. Prerequisites are two completed industrial environmental management courses and/or special permission from the instructor. Marian

Chertow

F&ES 96007b/ENAS 645b, Industrial Ecology 3 credits. Industrial ecology is an organizing concept that is increasingly applied to define the interactions of today's technological society with natural and altered environments. Technology and its potential for change are central to this subject, as are implications for government policy and corporate response. The course discusses how industrial ecology serves as an environmentally related framework for technology, policy, and resource management in government and society. Thomas E. Graedel

HISTORY AND THEORY

Kurt W. Foster and Emmanuel Petit, Study Area Coordinators

This study area explores the relationship between design, history, and theory through a broad range of courses in which the analysis of buildings, cities, landscapes, and texts supports the articulation and criticism of fundamental concepts, methods, and issues. Historical and contemporary projects and writings are studied in context and as part of the theoretical discourse of architecture.

For entering M.Arch. I students who have not had significant prior architectural training, the pre-first-year visualization course (1001c) includes a broad survey of western architectural history. For all M.Arch. I students, there is a first-year required survey course of nineteenth- and twentieth-century architectural history (3011a) followed in the second year by two required courses on architectural theory (3021a and 3022b). In addition, M.Arch. I students must satisfactorily complete two of the elective courses from this study area. One of the electives should be in a non-Western subject. Note that the elective courses 4211b, 4212b, 4213b, 4214b, and 4217b from the Urbanism and Landscape study area will satisfy one of the History and Theory elective requirements, although they cannot be used to satisfy both the History and Theory and the Urbanism and Landscape elective requirements. Courses offered outside of the School not listed below may fulfill this elective requirement provided permission from the study area

coordinators has been granted.

For the M.Arch. II program, there is a second-year required course dealing with issues of architecture and urbanism (3071a).

Required Courses

3011a, Modern Architecture (formerly 701a) 3 credits. (Required in M.Arch. I first year, fall term; available as an elective for M.Arch.II and M.E.D. students.) The course embraces the last century and a half in the history of architecture, when traditional fables began to yield to more scientifically conceived ideas of architecture's role in the creation of civilizations, when architecture began to contribute more directly to social and philosophical systems, and when expanding print and media culture accelerated the migration of ideas. In this course, major centers of urban culture and their characteristic buildings alternate with attention to individual concepts and their impact in an increasingly interconnected and global culture of architecture. Kurt W. Forster

3021a, Architectural Theory I: 1750–1968 (formerly 704a) 3 credits. (Required in M.Arch. I second year, fall term; available as an elective for M.Arch.II and M.E.D. students.) History of Western architectural theory, 1750–1968, through the close reading of primary texts. Lectures place the readings in the context of architectural history; the texts are discussed in required discussion sections. Topics include discussions of theories of origin and character, the picturesque, debates regarding style, historicism, and eclecticism, Gothic Revival, questions of ornament, architectural modernism, functionalism, and critiques of modernism. Emmanuel Petit

3022b, Architectural Theory II: 1968–Present (formerly 703b) 3 credits. (Required in M.Arch. I second year, spring term; and in M.Arch. II and M.E.D. first year, spring term.) This course is a survey of theoretical and critical literature on contemporary architecture. It explores the texts of post-war formalism, Marxism, and post-structuralism as well as current debates in globalization, post-humanism, and environmentalism in the architectural

discipline from 1968 to the present. Ariane Lourie Harrison

3071a, Issues in Architecture and Urbanism (formerly 717a) 3 credits.

(Required in, and limited to, M.Arch. II third term.) Current issues in architecture and urbanism, explored through seminars and case studies introducing methods and theories of architectural research. Fred Koetter

3091a, Methods and Research Colloquium (formerly 714a) 3 credits.

(Required in M.E.D. first year, fall term; available as an elective for M.Arch.I and M.Arch.II students.) This course introduces students to methods of architectural writing and research, laying the groundwork for an advanced research project. By investigating various text genres, such as surveys, journalism, manifestos, scholarly essays, critical essays, and narratives, this course studies ways of writing about architecture, urbanism, and the environment. Recent debates concerning the relationship between architectural history and theory and the questions about disciplinary and interdisciplinary boundaries are explored. Students are introduced to hands-on research through a series of library, archival, and GIS workshops that take place outside of class time. Students are expected to present different writing styles and formats through weekly assignments. Limited enrollment. Karla Britton

3092a or b, Independent M.E.D. Research 3–6 credits first year, fall term; variable credits remaining terms, determined in consultation with the director of M.E.D. Studies. (Required in and limited to M.E.D. each term.) The proposal submitted with the admissions application is the basis for each student's study plan, which is developed in consultation with faculty advisers. Independent research is undertaken for credit each term, under the direction of a principal adviser, for preparation and completion of a written thesis. The thesis, which details and summarizes the independent research, is to be completed for approval by the M.E.D. committee by the end of the fourth term. M.E.D. faculty

Elective Courses

3212a, Modern Japanese Architecture (formerly 747a) 3 credits. This seminar

studies the roots and genealogy of modern Japanese architecture—from the late nineteenth century, with Japan’s opening to the outside world after nearly two hundred years of isolation, through the “modern” phase beginning in the 1920s. The seminar attempts to understand the relationship between Japanese tradition and modernity within the context of Asia and the Occident. Personages and trends of modern Japanese architecture, beginning with the early students of Western architecture of the nineteenth century to the more recent practitioners such as Ito, Kuma, and Sejima, are explored. Students are required to give one presentation and a final paper. Limited enrollment. Hikeaki Ota

3213b, Architecture and Capitalism 3 credits. This seminar examines the relationship between capitalism and architecture from both a theoretical perspective—Marxism’s/neo-Marxism’s critique of culture, art, and architecture—and from an architectural perspective—architecture’s participation in, resistance to, and speculation about capitalism. The course examines six different periods of architectural history—pre-modern, early modern, high-modern, late-modern, post-modern, and contemporary—from what theorists in each period had to say about cultural/architectural production and from what architects in each period had to say about their role in capitalism. The theorists examined include Ruskin, thinkers of the Frankfurt School, Tafuri, Baudrillard, Slavoj Zizek, Naomi Klein while the architects include Morris, Mies, Hilberseimer, Coop Himmelblau, Peter Eisenman, Rem Koolhaas. Each week an initial 45-minute lecture by the professor is followed by in-class presentations and discussion by the students. A 15–20 page paper is required at the end of the term. Limited enrollment. Peggy Deamer

3214b, The Construction of Exactitude: Classicism and Modernism (formerly 757a) 3 credits. This seminar critically considers modern classicism not only as a compositional design method and as an evocation of precedents, but also as a language of clarity, reduction, and economy resistant to an unquestioned avant-gardist predilection for the “new.” Beginning with the fixed principles that were the legacy of nineteenth-century French and German Neoclassicism (unity, symmetry, proportion), the seminar continues up through the Rationalism and

Formalism that followed the Second World War. Issues explored include the concepts of the ruin and monumentality; the Modern Movement's analogies to the classical; and the representation of interwar national and political ideologies. Works studied include those by architects, literary/artistic figures, and theorists such as Richardson, Garnier, Perret, Le Corbusier, Rossi, Asplund, Lutyens, Terragni, Speer, Mies, SOM, Kahn, Valéry, Gide, de Chirico, Calvino, Rowe, Krier, Eisenman, Stern, Porphyrrios, and Colquhoun. Limited enrollment. Karla Britton

[3215b, Gross Domestic Product: A Research Seminar on the House

(formerly 748b) 3 credits. This research seminar investigates and reports on the state of the contemporary, speculative, single-family American house. While cognizant of the larger networks within which the house resides, this seminar focuses its research on the house itself and its immediate environment, the subdivision. The class collectively produces a graphic document that not only charts the historical development of the American single-family home, but also, more critically, reports on its current status, as well as trends for the future. Each student is responsible for a particular research territory that may include changing design directions, construction techniques (the ubiquitous platform frame), marketing strategies, subdivision development trends, financing methods, material transformations, the arrival of "smart" houses, and the boom in shelter magazines. Lectures by invited speakers and field trips supplement individual research that uses national databases, builder Web sites and plan catalogs, mortgage finance materials, shelter magazines, and personal interviews. Limited enrollment. Not offered in 2009–2010. Keith Krumwiede]

3216b, Case Studies in Modern Architectural Criticism (formerly 749b) 3 credits. This seminar concentrates on issues that influence the way modern buildings and their architects are perceived by critics, scholars, and the public. The careers of Frank Lloyd Wright, Eero Saarinen, Louis Kahn, Philip Johnson, and Robert Venturi provide a framework for the examination of how patronage, fashion, social change, theory, finance, and politics affect the place of prominent architects and their work in the historical record. Readings include such critics as Reyner Banham, Catherine Bauer, Alan Colquhoun, Henry-Russell Hitchcock,

Ada Louise Huxtable, William Jordy, Lewis Mumford, Colin Rowe, Vincent Scully, John Summerson, and Manfredo Tafuri. Responding to lectures by the instructor and visitors, students develop criteria for judging architectural quality (program, site, “message,” details, etc.), and then apply those criteria in three brief analytical papers that build toward a 2,500-word research paper investigating the elements that contributed to the “success,” “failure,” or “reevaluation” of an individual building, an architect’s career, or a body of architectural work. All written assignments are reviewed in individual conferences with the instructor. Limited enrollment. Carter Wiseman

3217a, Writing on Architecture (formerly 768a) 3 credits. The goal of this course is to train students in the principles and techniques of nonfiction writing as it applies to architecture. The course includes readings from the work of prominent architects, critics, and literary figures, as well as varying types and lengths of writings, such as brief reviews of books and exhibitions, opinion pieces, and formal presentations of buildings and projects. The main focus of the course is an extended paper on a building selected from a variety of types and historical periods, such as skyscrapers, private houses, industrial plants, gated communities, malls, institutional buildings, and athletic facilities. Limited enrollment. Carter Wiseman

3218a, Sustainability for Posthumans: Architectural Theories of the Environment 3 credits. This seminar explores posthumanist alternatives to the conceptual constraints and aesthetic limitations imposed by static interpretations of sustainability. The discourse of posthumanism—engaging networks, prostheses, envelopes—is not a claim for the new, but rather for alternative conceptions of the interaction between body, building, and environment. How does this framework offer a critique of sustainability’s anthropocentric biases as well as a means to render sustainability’s arguments more adaptive and robust? Limited enrollment. Ariane Lourie Harrison

3219b, Architectural Multiplications (formerly 750b) 3 credits. This seminar investigates contemporary approaches to architecture, in which the question of

multiplication is made thematic, and proposes a theoretical approach to understanding a series of buildings and books since the early 1990s, such as the Yokohama Ferry Terminal, Animate Form, the Eyebeam competition, Farmax, the Embryological House, Move, and SMLXL. Limited enrollment. Emmanuel Petit

3220b, Contemporary Architectural Discourse Colloquium (formerly 752b) 3 credits. Organized by second-year M.E.D. students in collaboration with the director of M.E.D. Studies, this colloquium brings in guest speakers from all disciplines to discuss their work around a selected topic. This year's colloquium examines the shifting definitions of locality caused by new technologies and practices. Specific and precise on one hand and dynamic and elusive on the other hand, these new territorial strategies are used to revisit concepts that have defined thinking about architecture's relationship to a particular locale, such as "place," critical regionalism, internationalism, and globalism. Conceived as a collaborative workshop, this colloquium aims to interpret the emerging geopolitical and spatial terrains that inform architecture. Students with interests from other fields are strongly encouraged to enroll. Limited enrollment. Peggy Deamer

[3221b, Performance Criticism: Reyner Banham (formerly 753b) 3 credits. This seminar examines the performance-based critical method of Reyner Banham, a central figure in the construction of post-war architectural discourse and founding member of the Independent Group, from his early reflections on the foundation myths of modern architecture through to his wide-ranging examination of architecture's erratic engagement with the changing material, cultural, and technological landscape of the twentieth century. The course includes lectures by the instructor but focuses on weekly readings and discussions of primary texts by Banham and other Independent Group players including Richard Hamilton, Alison and Peter Smithson, and Lawrence Alloway. Students are responsible for a written and oral presentation that assesses the performance of a contemporary project. Limited enrollment. Not offered in 2009–2010. Keith Krumwiede]

3222a, Venice: Urban and Architectural Histories of a Maritime Republic 3 credits. This seminar explores Venice, a place where the multiple histories of politics, commerce, religion, art, and science intersect, all of which are sedimented in the reciprocal relation of architecture and urban form. The course traces the genesis and the development of the city from late antiquity to the present; investigates how political myth and urban reality are mutually implicated in the Piazza S. Marco, the Rialto and the Grand Canal; and examines the various formal, structural, and functional strategies that architects as diverse as Codussi, Sansovino, Palladio, Scamozzi, Longhena, Frank Lloyd Wright, Le Corbusier, and Carlo Scarpa employed to express this interdependence. Presupposing a long history of morphological development punctuated by specific architectural interventions, this seminar envisions Venice as a city suspended between land and sea, aristocracy and republic, the periphery of the Italian mainland and the center of a vast trading Empire, highlighting the multiple constraints that led to immemorial qualities of invention and collective memory. Limited enrollment. Daniel Sherer.

3223a, Parallel Moderns: Toward a New Synthesis? 3 credits. This seminar puts forward the argument that what many have accepted as the mutually exclusive discourses of tradition and innovation in the modern architecture of the first half of the twentieth century—respectively identified as the “New Tradition” and the “New Pioneers” by Henry-Russell Hitchcock in his *Modern Architecture: Romanticism and Re-integration* (1929)—in fact share common genealogy and are integral to its history. The seminar explores in depth key architects working in the “New Tradition” and goes on to explore its impact for postmodernism in the 1970s and 1980s. The possible emergence of a new synthesis of seeming opposites in the present is also considered. Limited enrollment. Robert A.M. Stern

3224b, Architecture: Fragment and the Absolute (formerly 759b) 3 credits. This seminar investigates the theoretical underpinnings of the diverse strands of formalism in the architectural discussion of the 1970s and early 1980s. Passing from the analysis of structural theories of form, to its semantic configurations,

and to its post-structuralist displacements, the seminar sheds light on the intellectual trajectory of a specific historical period after Modern architecture and within modernism. Special emphasis is given to the discussions around the Oppositions group and to the influence of French philosophy on formalist architecture. The second half of the seminar relates the proposed topics to built architectural artifacts, and thus stresses the mutual interdependence of physical object and architectural theory. The seminar analyzes how formalist transformations build relationships to modernist precedent from which to “swerve.” Limited enrollment. Emmanuel Petit

3225b, Religion and Modern Architecture (formerly 769b) 3 credits. The design of religious architecture challenges the creative capacities of prominent architects, yet this domain has largely gone unnoticed within the field. In an inter-religious and inter-disciplinary context, this seminar offers a fresh examination of the history of modern architecture through a close analysis of a single building type—the religious building (mosques, churches, synagogues, and temples). Drawing on guest speakers, this course opens a discourse between the disciplinary perspectives of philosophy, theology, liturgical studies, and architectural history and theory on the influence religion has come to exert in contemporary civic life, and the concretization of that role in the construction of prominent religious buildings. Questions addressed include: How can the concept of the “sacred” be understood in the twenty-first century, if at all? In what contexts is it intelligible? In a pluralist society, in which the spiritual is often experienced individually, how can architecture express communal identity or tradition? How are concepts of the ineffable realized in material form? Architects discussed included Perret, Plecnik, Lutyens, Wright, Le Corbusier, Mendelsohn, El-Wakil, Tange, Kahn, Ando, Barragan, Moneo, Eisenman, Hadid, and Shim. Limited enrollment. Karla Britton

3226b, Lateral Strategies: Architecture and Activism (formerly 773b) 3 credits. This seminar researches architecture and activism. Some of the most radical changes to the globalizing world are written not in the language of law and diplomacy but rather in the language of architecture and urbanism. The

notion that there is a proper forthright realm of political negotiation usually acts as the perfect camouflage for consequential activity that resides in the unofficial currents of cultural and market persuasion. This seminar tutors spatial entrepreneurialism, impure ethical struggles, and a new species of spatio-political activism. In sequential weeks, the seminar considers these in relation to a topic and two thinkers. Activism and: piracy (Sloterdijk, De Certeau), comedy (Critchley, Goffman), entrepreneurialism (Banham, Price), law (Agamben, Balibar), organization (Meyer, Castells), aesthetics (Ranciere, Bourriaud), polity (Mattelart, Latour), sovereignty (Habermas, Retort), violence (Virilio, Guattari), ethics (Badiou, Levinas). Limited enrollment. Keller Easterling

3227a, Tropical Architecture 3 credits. This seminar course focuses on the historical and contemporary factors which have shaped and could possibly shape architectural form in the tropical and subtropical zones around the globe. The goal of this course is to broaden research regarding contemporary architecture's potential in the neglected regions located between the Tropic of Cancer (northern equatorial zone) and Tropic of Capricorn (southern equatorial zone). The critical topics include the issue of indigenous, vernacular, and colonial regional form; translation of international modernism; climate-based issues and design parameters; contemporary social and cultural issues; and potential of sustainability and contemporary discourse. Students prepare presentations on the geographical regions and are required to produce a critical research document of a contemporary building type that incorporates sustainable strategies and innovative design unique to these diverse cultural and climate locales. Limited enrollment. Dean Sakamoto

3228b, The Autobiographical House (formerly 782a) 3 credits. Architects and artists have long built dwellings for themselves (and for surrogate clients) as showcases of their art, sites of collecting and teaching, and as retreats from professional life. From Thomas Jefferson to Philip Johnson, from John Soane to Eileen Gray and Frank Gehry, building a house of one's own often harks back to Renaissance and Baroque models while experimenting with new manifestations of the architect's evolving role. This seminar examines such buildings as well as

wide-ranging readings in artistic autobiography. Limited enrollment. Kurt Forster

[3229b, Architecture, Post-9/11 (formerly 788b) 3 credits. This seminar examines the often undiscussed, but impossible to ignore, changes that have entered into our conception of architecture since 9/11. The seminar takes as its premise that the events of 9/11 have subtly but profoundly altered the manner in which we conceive of the potential of our work as architects, be it professional, aesthetic, theoretical, social, or academic. The status of form and theory, the environment and human habitation, production and markets, risk and safety, power and symbolism, are seen through different lenses, whether we are aware of it or not. The seminar moves from the most concretely 9/11 related material—designs for the redevelopment of Ground Zero and the comments they provoked—to the more abstract issues of post-criticality that unwittingly play out themes and positions related to our fear of a diminished role for architects. In between, changing attitudes toward the environment, cities, global production and markets, and fear/risk management are examined. Students are required to make in-class presentations of topics of their choice and write a twenty-page paper. Limited enrollment. Not offered in 2009–2010. Peggy Deamer]

3231b, Art in Architecture: 1945–1965 3 credits. Architecture, sculpture, and painting have arguably never been so mixed up as in the recent past. While the magnetic field that links architecture to the visual arts has become a prime condition of formgiving, the status of modern art in the public realm is severely challenged. Certain CIAM debates that took place between 1947 and 1956 offer surprising insights into some roots of this condition. This seminar focuses on architectural theory and practice in the Cold War era. Key works by architects like Le Corbusier, A. van Eyck, A. and P. Smithson, BBPR, M. Bill, and others are examined in the light of the ideas on the “Synthesis of the Arts” proposed in the 1950s. Alternating with a series of introductory classes, key texts on the dialogue of the arts by authors like Hitchcock, Giedion, Krauss, Foster, and others are discussed. In the second half of the term each student presents a written case study relating to a relevant project by any of the listed architects as well as by

more recent ones like F. Gehry, Herzog & de Meuron, P. Zumthor, or others.
Limited enrollment. Stanislaus von Moos

3233b, Venturi Scott Brown and Associates in Context 3 credits. This seminar examines a choice of projects and buildings by Venturi Scott Brown and Associates in the light of such issues as mannerism, historicism (and neo-historicism), Modernism in architecture, as well as contemporary strategies of urban design. The course runs parallel to the exhibition “What We Learned: The Yale Las Vegas Studio and the Work of Venturi Scott Brown and Associates” that takes place in the School’s Architecture Gallery between November 2009 and February 2010 and a symposium on Las Vegas in January 2010. Students are expected to present their own analysis of a chosen built or unbuilt Venturi Scott Brown and Associates project against the background of relevant issues in architectural and/or urban theory, social sciences, or contemporary art and to consider these architects’ own theoretical writings. Non-written forms of presentation (tapes, etc.) are also encouraged. Limited enrollment. Stanislaus von Moos

3235b, Architecture and Mobility 3 credits. This seminar introduces students to contemporary forms of theory and design as it relates to the influence of science and technology on issues of mobility and temporality in architecture. The seminar traces this influence from early modernism through the period of the 1950s and 1960s, with an examination of design and criticism from the period including Reyner Banham, John Summerson, John McHale, Cedric Price, Alison and Peter Smithson, Buckminster Fuller, and Archigram. The first section of the course consists of introductory lectures by the instructor. The second section consists of student presentations. A fifteen-page research paper is required.
Christopher Perry

3236b, Modernism in Yugoslavia, 1918–1991: Architecture, Politics, and Everyday 3 credits. This seminar investigates how the discourses of modern architecture and urbanism are challenged, selectively appropriated, and transformed without the mainstream production of the developed Western

world. Focusing the inquiry on modernism in Yugoslavia, the seminar considers it in a broader international and comparative context of politics, art, and architecture of the twentieth century. The seminar looks at the works of art and architecture, and at the specific ways in which the actors of avant-garde and modern movement, as well as of the post-WW2 modernism, critically positioned their discourses, disseminated ideas, and effected the profound changes of the everyday life through different practices. The students are asked to critically engage in the issues of politics and space, and to explore the relation of planning and architecture, as well as of art and culture in general, to historical and political processes. The exploration of the everyday is used as a critical tool for investigating broader socio-political issues. Readings consist of a variety of materials including books on the subject, periodicals and magazines, studies of socio-political context, films and catalogues, and theoretical texts. Students are asked to engage in comparative critical studies of specific architectural ideas, which they present in class. Aside from reading, participating in discussions, and in-class presentations, students are asked to submit written responses on the subject during the course of the semester. Limited enrollment. Ljiljana Blagojević

3299a or b, Independent Course Work 3 or 6 credits. Program to be determined with a faculty adviser of the student's choice and submitted, with the endorsement of the study area coordinator, to the Rules Committee for confirmation of the student's eligibility under the rules. (See the School's *Academic Rules and Regulations*.)

The following courses offered elsewhere in the University will fulfill the History and Theory elective requirement and may be taken with the permission of the instructor.

HSAR 238a/ARCG 238a/NELC 107a, Buried Cities: Thera, Pompeii, and Herculaneum Study of three ancient cities buried by volcanic eruptions—Thera in ca. 1530 B.C. and Pompeii and Herculaneum in A.D. 79—with emphasis on their architecture, wall paintings, and small finds in cultural and historical

context. Karen Foster

HSAR 252a/ARCG 252a/CLCV 175a, Roman Architecture The great buildings and engineering marvels of Rome and its empire. Study of city planning and individual monuments and their decoration, including mural painting. Emphasis on developments in Rome, Pompeii, and central Italy; survey of architecture in the provinces. Diana Kleiner

HSAR 385b/SAST 258b, Temple Towns of South Asia Survey of the history, forms, symbolisms, and meanings of South Asian temple architecture. Focus on Hindu structures, with some examination of Buddhist and Jain buildings. Tamara Sears

HSAR 420a/HUMS 417a, Monuments of Naples: City and Self Study of architectural and sculptural monuments erected in Naples and Campania during the Middle Ages and the Renaissance. The effects of changes in both rulers and cultural traditions over time. The structure of monuments; interactions with other monuments and the built environment; issues of patronage; the construction of personal and social identity. Mia Genoni

HSAR 570a/ARCG 749a/CLSS 846a, Becoming Hadrian: Autobiography and Art in the Second Century A.D. Marguerite Yourcenar's famed fictional *Memoirs of Hadrian* serves as the starting point for an exploration of Hadrian and the art he commissioned in Rome and abroad. Hadrian's passion for life, quest after peace, romantic wanderlust, veneration of Greek culture, and craving for love, along with his acceptance of death's inexorableness, led him to commission some of Rome's greatest monuments. The emperor's flair for leadership and talent as an amateur architect inform student projects on the sculpture, mosaics, and buildings of the age, among them the portraiture of Hadrian's lover Antinous, the Pantheon, and Hadrian's Wall in Britain. Special attention is paid to Hadrian's Villa at Tivoli, an empire unto itself where Hadrian's autobiography was fully realized. Qualified undergraduates who have taken Roman Art: Empire, Identity, and Society and/or Roman Architecture may be admitted with permission of the instructor. Diana Kleiner

HSAR 579a, Modernism and the Middle East This course studies the concepts that inform the making and reception of modern architecture in the Middle East. In the Islamic world, new fundamentalisms and shifting religious trends have created an environment in which each country must renegotiate its past and reconsider its collective future. Whether by suppressing their Islamic roots, as in the case of republican Turkey, or through reinventing them, as in the case of post-Revolution Iran, such countries must constantly transform their national image. It is through public works, such as architecture and planning, that they convey their political and religious ideology. This course examines the debates and theories of modern architectural production that have informed the discourse on Islamic architecture by situating cases of colonial and nationalist architecture in the context of their particular social and religious history. Kishwar Rizvi

HSAR 744a, Aztec Art and Architecture An examination of works of art and architecture created in central Mexico in the fifteenth and sixteenth centuries by the people history has dubbed the Aztecs, but who called themselves the Culhua-Mexica. Particular attention is paid to the capital city of Tenochtitlan, one of the largest cities in the world in the sixteenth century, where ecological and political imperatives gave shape to the urban form, architecture, and programs of public monuments. The course emphasizes the use of primary sources (ethnohistorical accounts, archaeological data, and literature) in interpreting works of Aztec art as well as the methodological challenges that writing Aztec art history poses to the discipline. Barbara Mundy

HSAR 781a/AFAM 739a/AFST 781a, Problem and Theory in Afro-Atlantic Architecture I: Africa The seminar addresses a new frontier—rebuilding the inner cities. This refers to Latino and mainland black cities within the cities of America. Accordingly, the course focuses on major roots of Latino and black traditional architecture. Topics include the architecture of Djenne, Berber art and architecture, Mauritanian sites, the monumental stone architecture of Zimbabwe, the sacred architecture of Ethiopia, and Muslim-influenced architecture from Rabat to Zanzibar. Then comes a case-by-case examination of some of the sites of

African influence on the architecture of the Americas—the Puerto Rican *casita*; the southern verandah; the round-houses of New York, Virginia, North Carolina, Mexico, Panama, and Columbia; Ganvie, the Venice of West Africa, and its mirror image among the tidal stilt architectures of blacks of the Choco area in Pacific Columbia. Robert Thompson

HSAR 781b/AFAM 739b/AFST 781b, Problem and Theory in Afro-Atlantic Architecture II: The Black Americas A continuation of HSAR 781a. Robert Thompson

HSAR 795a, Architecture and Ritual in Southern Asia This seminar explores various cross-cultural and interdisciplinary approaches for understanding both how ritual engages the built environment, and how sacred spaces actively shape devotional and haptic experience. Among the issues we consider are the relationships between visibility and spatiality, oral performance and architectural imagery, and the interface between past and present histories. Although primarily focused on the Indian subcontinent, the seminar is methodologically and theoretically driven. It incorporates weekly readings drawn both from other world areas (i.e., East Asia, the Americas, Europe, and Africa) and from other academic disciplines (i.e., performance studies, religious studies, anthropology, and social archaeology) in order to assess the utility of different approaches to sacred architecture. Students are encouraged to incorporate methods and frameworks developed in the seminar into a final research paper on a topic of their choice. Tamara Sears

HSAR 808a, The Phoenix Hall of Byodoin A graduate-level seminar that critically examines the Amida Hall, or Phoenix Hall, built in 1053 on the grounds of the villa of Fujiwara Yorimichi. The building is one of the most celebrated cultural productions of Japan, and much has been written about it. And yet the circumstances of its design, and the anomalous nature of its format and iconography, raise many important questions about its construction and reception. I have published extensively (and occasionally controversially) about the Phoenix Hall; there is also a massive amount of material on the building in

English, Japanese, and Chinese secondary sources. Mimi Yiengpruksawan

URBANISM AND LANDSCAPE

Alan Plattus and Elihu Rubin, Study Area Coordinators

In this study area, a broad range of courses explore the aesthetic, economic, social, and political influences on the spatial form of urban places and the urban, suburban, and rural landscapes that form our design ecology.

For the M.Arch. I program, required courses in this study area include an introduction to urban design (4011b), an introduction to planning and development (4021a), and the satisfactory completion of one of the elective seminar courses from this study area. Courses offered outside the School not listed below may fulfill this elective requirement provided permission from the study area coordinators has been granted.

Required Courses

4011b, Introduction to Urban Design (formerly 902b) 3 credits. (Required in M.Arch. I first year, spring term.) This course is an introduction to the history, analysis, and design of the urban landscape presented with weekly lectures and discussion sections. Emphasis is placed on understanding the principles, processes, and contemporary theories of urban design, and the relations between individual buildings, groups of buildings, and the larger physical and cultural contexts in which they are created and with which they interact. Case studies are drawn from New Haven and other cities. Elihu Rubin, Andrei Harwell

4021a, Introduction to Planning and Development (formerly 903a) 3 credits. (Required in M.Arch. I second year, fall term.) This course demonstrates the ways in which financial and political feasibility determine the design of buildings and the character of the built environment. Students propose projects and then adjust them to the conflicting interests of financial institutions, real estate developers, civic organizations, community groups, public officials, and the widest variety of participants in the planning process. Subjects covered include

housing, commercial development, zoning, historic preservation, parks and public open space, suburban subdivisions, and comprehensive plans. Alexander Garvin

Elective Courses

4211b, Intermediate Planning and Development (formerly 905b) 3 credits. This seminar examines the interaction of building design with local market conditions, financing alternatives, and political context. During the first part of the term, students learn how to analyze a specific neighborhood (in New York City) by using fundamental planning techniques and examining national trends within that neighborhood. Topics include housing, retail, and office development; zoning; historic preservation; transportation; business improvement districts; and building re-use and rehabilitation. In the second part of the term students prepare recommendations for the neighborhood that will meet the conflicting interests of financial institutions, real estate developers, civic organizations, community groups, public officials, and a wide variety of participants in the planning and development process. The end product is a printed book presenting the results of their work. Prerequisite: 4021a, STCY 176b, or equivalent course work. Limited enrollment. Alexander Garvin

4212a, American Cultural Landscapes: An Introduction to the History of the Built Environment (formerly 912a) 3 credits. The cultural landscape in the United States puzzles observers who try to decode unwise decisions about land use and energy, haphazard planning for transportation and infrastructure, and vigorous promotion of various vernacular building types. Politics, real estate speculation, and popular culture are part of the mix. After a brief review of Native American and colonial settlements, this lecture course surveys the growth of towns and cities between 1800 and 1920, then examines the shift between 1920 and the present, when residential and commercial activities move away from city centers into diffuse, automobile-dependent metropolitan regions. Students complete one brief writing assignment and one fifteen-page paper. Dolores Hayden

[4213a, Gender, Territory, and Space (formerly 922a) This seminar explores women's and men's everyday experiences of built environments and the city and considers how gender (along with race, class, age, and sexual orientation) affects the design and use of a range of spaces from the most private to the most public. The main focus is on the United States from the late nineteenth century to the present, but other countries offer examples of built projects fostering full citizenship or practices of spatial segregation that deny basic civil rights. Readings are drawn from architecture, history, gender studies, and geography. Students are required to present papers. Limited enrollment. Not offered in 2009–2010. Dolores Hayden]

4214b, Built Environments and the Politics of Place (formerly 914b) 3 credits. Call it the built environment, the vernacular, everyday architecture, or the cultural landscape, the material world of built and natural places is intricately bound up with social and political life. This seminar explores research methods and sources for writing the history of the built environment, including Sanborn maps, aerial and ground photographs, planning documents, oral histories, landscape analysis, and GIS. It includes readings from urban and suburban history, geography, anthropology, and architecture as well as readings on narrative and graphic strategies for representing spaces and places. Students present papers. Sections from longer theses or dissertations in progress are welcome. Dolores Hayden

4216a, Globalization Space: International Infrastructure and Extrastatecraft (formerly 926a) 3 credits. This lecture course researches global infrastructures as a medium of transnational polity. Lectures visit the networks of trade, communication, tourism, labor, air, rail, highway, oil, hydrology, finance, and activism. Case studies travel around the world to, for instance, free trade zones in Dubai, IT campuses in South Asia, high-speed rail in Saudi Arabia, cable/satellite networks in Africa, highways in India, a resort in the DPRK, golf courses in China, oil-financed development in Sudan, and automated ports. Infrastructure histories are often stories of nation-building. These investigations begin in transnational territory where new infrastructure consortia operate in parallel to

or in partnership nations. Not only an atlas or survey of physical networks and shared protocols, the course also considers their pervasive and long-term effects on polity and culture. Infrastructures may constitute a de facto parliament of global decision-making or an intensely spatial extra statecraft. Each week, readings, both evidence and discursive commentary, accompany two lectures and a discussion section. A short midterm paper establishes each student's research question for the term. A longer final paper completes the requirements of the course. Limited enrollment. Keller Easterling

4217b, Suburbs and the Culture of Sprawl (formerly 925b) 3 credits. In 2000, more Americans lived in suburbs than in rural areas and inner cities. This seminar explores the shifting meanings of city, suburb, and countryside in the American landscape since 1920. Definitions of sprawl include both the expansion of metropolitan peripheries and the decay of city centers, examined through readings from history, geography, architecture, and literature. Students present papers. Limited enrollment. Dolores Hayden

[**4219b, Urban Research and Representation** (formerly 941b) 3 credits. Every day, architects and urban designers make proposals that shape the public and private realms of the city. This seminar sets out to contextualize the social and political ramifications of these interventions; to intensify the designer's tool kit of deep, socio-historical research of site and place; and to cultivate a reflexive practice that considers seriously the social responsibilities of both the architect and the urban researcher. In the classroom, and in the field, this seminar introduces a diverse set of methods for studying the urban environment, from the archival and visual to the observational and ethnographic. Limited enrollment. Not offered in 2009–2010. Elihu Rubin]

[**4220b, Transition Impact: Post-Socialist City in the Transnational World** (formerly 955b) 3 credits. This research seminar delves into the profound changes of architecture and urbanism of the postsocialist cities in Central and Eastern Europe and the former Soviet Union. The course explores how the structure of the modern socialist city yields to the processes of sociopolitical and

economic transition. What are the outcomes and effects of contemporary global transformation of these cities, initially invested with the vision of communist internationalism? Case studies include shrinking cities, energy cities, modern city in free market landscape, and import of starchitecture. Students are expected to actively participate in seminar debates, perform research on a mutually agreed-upon topic and present it in class, and develop their own research portfolios on the selected topic. The ultimate goal is to familiarize students with key processes and to enable them to engage critically with transnational contemporary practice in this part of the world. Limited enrollment. Not offered in 2009–2010. Ljiljana Blagojević]

4221b, Commercial Real Estate Principles and Practice (formerly 937b) 3 credits. Much of the built environment is commercial real estate, which is income producing property that is built, financed, and sold for investment. This course examines five basic types of commercial real estate (office, industrial, retail, multifamily, and hotel) from the standpoints of the developer, lender and investor. Principles of location, financing, timing of market cycles, leasing, ownership structure, and external factors are explored. Students are expected to evaluate assets, partnership interests and other positions such as debtor interests through valuation measurement, which requires the use of some simple mathematics. An HP-12C calculator or laptop computer with Excel is required. In addition to out-of-class assignments, a brief exercise is included during each class. Students also examine commercial deeds, leases, partnership agreements and other legal documents. Each student selects a building or development site within New Haven County for a due diligence analysis of zoning, real estate taxes, deeds, liens, market supply and demand, projected income and expenses, and availability of debt. Limited enrollment. Kevin Gray

4222a, History of Landscape Architecture: Antiquity to 1700 in Western Europe (formerly 765a) 3 credits. This course presents an introductory survey of the history of gardens and the interrelationship of architecture and landscape architecture in Western Europe from antiquity to 1700, focusing primarily on Italy. The course examines chronologically the evolution of several key elements

in landscape design: architectural and garden typologies; the boundaries between inside and outside; issues of topography and geography; various uses of water; organization of plant materials; and matters of garden decoration. Specific gardens or representations of landscape in each of the four periods under discussion—Ancient Roman; medieval; early and late Renaissance; and Baroque—are examined and situated within their own cultural context. Throughout the seminar, comparisons of historical material with contemporary landscape design are made. Limited enrollment. Bryan Fuermann

4223b, History of British Landscape Architecture: 1600 to 1900 (formerly 766b) 3 credits. This seminar examines the history of landscape architecture and of the idea of nature in Britain from 1600 to 1900. Topics of discussion include Italian and French influences on the seventeenth-century British garden; the Palladian country house and garden; naturalism and the landscape park as national landscape style; garden theories of the picturesque and of the sublime; Romanticism and the psychology of nature; the creation of the public park system; arts and crafts landscape design, and modernist landscape idioms. Comparisons of historical material with contemporary landscape design are emphasized throughout the term. The collection of the Yale Center for British Art is used for primary visual material, and a trip to England over spring break, partially funded by the School, allows students to visit firsthand the landscape parks studied in this seminar. Limited enrollment. Bryan Fuermann

4224b, Site + Building (formerly 695b) 3 credits. This seminar investigates buildings and their sites. Conceived as a vehicle for understanding the relationship between site and building through critical analysis, the course examines ancient, historic, and contemporary works of architecture and landscape architecture. Material includes works by Hadrian, Diocletian, Michelangelo, Raphael, Palladio, Durand, Schinkel, Lutyens, Asplund, Aalto, Wright, Mies, Kahn, Neutra, Saarinen, Scarpa, Bawa, Krier, Eisenman, Ando, and Gehry. The seminar focuses on site organization strategies and philosophies of site manipulation in terms of topography; urban, suburban, and rural context; ecology; typology; spectacle; and other form-giving imperatives. Methods of site

plan representation are also scrutinized. Requirements include three significant readings, one major class presentation, and the keeping of individual class notebooks. Stephen Harris and visitors

4225a, Learning From Landscape 3 credits. This research seminar investigates key operative strategies in urban landscape design using projects in New York City as textbook examples. Research focuses on the relationship among urban context, open space design, and social interaction, paying particular attention to the way specific landscape typologies address social and spatial competition in the urban environment. Each class begins with a short introductory lecture by the instructor, which is followed by student analysis, as well as diagrams, plans, and sections of existing site conditions. Key to this approach is an understanding of the relationship among materials, form, space, scale, temporality, and the social activation of the site via circulation and programming. The students collectively assemble the analyses into a graphic document and an electronic presentation on the School's Web site. A field trip to New York City to study the landscape design of Central Park is an integral aspect of the seminar. Limited enrollment. Kathleen John-Alder

4226b, Ecological Urbanism: New Approaches to Urban Ecology and City Planning 3 credits. Students from both the School of Architecture and the School of Forestry & Environmental Studies collaboratively explore and define ecologically based urban design. The course consists of three phases: an overview, a research and analysis phase, and a production phase. During the first phase, students review existing urban ecological data and current methods for analyzing urban ecosystems at multiple scales. Students also study precedents for ecological urbanism, such as manufactured nature, green infrastructure, and landscape urbanism as well as broader ecological concepts applied to coupled human-natural systems. During the second phase, interdisciplinary teams select urbanization processes as case studies and work together focusing on history, invention, ad hoc growth, planning, and design. Students identify existing urban data on their case studies and seek innovative strategies to generate further data. Teams work to define their case studies in terms of urban ecology. During the

final phase, students build on their site analysis exercises to generate urban design proposals. Proposals are to be ecologically driven and to explore options for the kinds of urban forms or aesthetics that result from integrating ecological data and analysis with city planning and design. Limited enrollment. Alexander Felson

4299a or b, Independent Course Work 3 or 6 credits. Program to be determined with a faculty adviser of the student's choice and submitted, with the endorsement of the study area coordinator, to the Rules Committee for confirmation of the student's eligibility under the rules. (See the School's *Academic Rules and Regulations*. Available for credit to fulfill the M.Arch. I Urbanism and Landscape elective requirement with the approval of the study area coordinators.)

The following courses offered elsewhere in the University will fulfill the Urbanism and Landscape elective requirement and may be taken for credit with the permission of the instructor.

F&ES 32007b, Ecosystem Pattern and Process 3 credits. Ecosystem science provides a unique vantage point from which scientists can begin to understand complex adaptive systems. The basis of ecosystem science is to determine how patterns in biological processes emerge from interactions between organisms and the abiotic environment. This course introduces the ecosystem concept, investigates the structure and functioning of ecological systems, studies the response of systems to changing environmental conditions, and applies resulting knowledge to preservation and management issues. Presentation is balanced between terrestrial and marine/aquatic systems. Peter Raymond, Mark Bradford

F&ES 80018b, Environment and Development: An Economic Approach 3 credits. This class examines the relationships between environment and development from the perspective of economics. We use economic tools and concepts to answer a set of questions about these relationships. In what ways can economic growth lead to improvements in environmental quality? In what ways is growth likely to generate environmental damage? How do policies alter the

balance between human prosperity and environmental health? Can they lead to simultaneous improvements in both? To what extent are bad environmental outcomes the result of economic growth itself, and to what extent do they stem from market failures or institutional failures? This is an advanced economics class. Students are expected to have taken an economics class at F&ES already and to be familiar with basic economic tools. Douglas Gollin

F&ES 80019a/MGT 618a, Entrepreneurial Business Planning 3 credits.

Entrepreneurship is all about starting and running one's own business. In order to focus thinking and to help assemble the needed people and financial resources, most entrepreneurs write a business plan for their new venture. One of the best ways to learn how to write a business plan is to learn by doing—a real plan for a real new venture. The work is hands-on, learn-by-doing in nature. Entrepreneurs should be flexible thinkers and highly motivated, with a large capacity for work. They must be persistent and able to thrive in an unstructured environment. Entrepreneurs should be confident self-starters with the ability to take the initiative, overcome obstacles, make things happen, and get things done. This course is for six teams of five students each, who write a business plan for their own real new startup company. Students enter their plans in the Y50K Business Plan Contest sponsored by the Yale Entrepreneurial Society. The scope of the work includes doing in-depth market, product, and competitor research; creating a strategy for a sustainable business; and writing and presenting a professional-quality plan (including a financial model and deal structure). Enrollment limited to thirty, by permission of the instructors. There is an information session in September explaining how to apply for this course; date TBA. David Cromwell, Maureen Burke

F&ES 80029a, Local Environmental Law and Land Use Practices 3 credits.

This course explores the regulation by local governments of land uses in urban and watershed areas and the effect of development on the natural environment. The course helps students understand, in a practical way, how the environment can be protected through effective regulation at the local level. It introduces students to federal, state, and regional laws and programs that affect watershed

protection and to the laws that delegate to local governments primary responsibility for decision making in the land use field. Theories of federalism, regionalism, states' rights, and localism are studied. The history of the delegation of planning and land use authority to local governments is traced, leading to an examination of local land use practices particularly as they relate to controlling development in and around watershed areas. Course participants engage in empirical research working to identify, catalogue, and evaluate innovative local laws that successfully protect environmental functions and natural resources, and the manner in which towns, particularly on the coast, incorporate climate change into their planning and regulations. Nearby watersheds are used as a context for the students' understanding of the strengths and weaknesses of local planning and regulation. Attention is paid, in detail, to how the development of the land adversely affects natural resources and how these impacts can be mitigated through local environmental regulations. The course includes examination of the state and local response to climate change, sea level rise, growth management, alternatives to Euclidean zoning, low-impact development, brownfields, and other innovative land use strategies. Marjorie Shansky

F&ES 80031b, Transportation, Energy, and the Economy 3 credits. This course focuses on the critical, but often overlooked, impacts of the transportation sector on the nation's changing economy and patterns of growth, and on decision making by both public officials and private actors affected by these issues. The course seeks to provide students with insights into such matters as how the transportation system has shaped America's economy, living patterns, and quality of life; how global economic, demographic, and environmental changes are imposing themselves on transportation investment and operational decisions; and how transportation-related public agencies and private firms are being reshaped to address the economic and environmental realities of the twenty-first century. The stakeholders and constituencies in the transportation sector include both private and public actors, and the complicated interactions between decisions in both sectors are critical to the efficient operation of the economy and to the quality of our lives. Transportation-related decisions have substantial

social, environmental, and community impacts that must be taken into consideration in long-term strategic planning for private firms and public agencies, and it is the goal of this course to expand students' understanding of these issues and their ability to analyze them. Grades in the course are based both on preparation and participation in class discussions, and on writing assignments. The class meets once each week during the term. Emil Frankel

F&ES 80046a,b, Business and the Environment Consulting Clinic 3 credits.

In this class, students work as a team on a specific project for an external organization. It provides students with an opportunity to apply their knowledge of business and environmental issues to real-life situations. It also provides a unique opportunity for students to manage a real-life consulting client engagement. Examples of projects include (1) developing a corporate sustainability scorecard for an organization's suppliers, (2) researching the market opportunity for a new environmentally friendly product or service, (3) recommending operational improvements around energy usage, waste disposal, etc. The intent is to provide a "capstone" experience, calling for the application of skills and tools learned from previous classes. Class times alternate between team meetings and lectures. Lectures address topics such as project management, environmental science and technology issues, business evaluation and financial valuation, and influencing environmental policy and include guest speakers from organizations tackling environmental issues. The clinic is open to both F&ES and SOM students. Prerequisites for F&ES students applying to the clinic are at least one of the following courses (or equivalent experience): F&ES 50021a, Financial Analysis for Land Management; F&ES 80019a, Entrepreneurial Business Planning; F&ES 85030a, Private Investment and the Environment; F&ES 96006a, Greening the Industrial Facility; F&ES 96112a, Corporate Environmental Management and Strategy; or F&ES 94110a, Public and Private Management of the Environment. SOM students need to have completed their first term at the School. Maureen Burke, Bradford Gentry

[F&ES 80103b, Valuing the Environment 3 credits. This quantitative course demonstrates alternative methods used to value environmental services. The

course covers valuing pollution, ecosystems, and other natural resources. The focus of the course is on determining the “shadow price” of nonmarket resources that have no prices but yet are considered valuable by society. Taught every other year. Three hours lecture. Not offered in 2009–2010. Robert Mendelsohn]

F&ES 80116b, Emerging Markets for Ecosystem Services 3 credits. The modern economy consumes many ecosystem services without paying for their production: forested areas protect water resources; plants sequester carbon; intact ecosystems protect biodiversity and its associated services (potential pharmaceuticals, existence value, etc.). In response, a growing number of experiments are under way to make consumers of ecosystem services pay the producers of the services, thus creating market incentives to sustain intact, biologically diverse areas. However, these experiments are in their infancy and raise a host of ethical, scientific, commercial, and policy questions. The purposes of this seminar are (1) to understand these opportunities and their limits, by examining current scientific, commercial, and policy knowledge relevant to building markets for ecosystem services and (2) to apply the lessons learned to actual properties or questions by analyzing the scientific, business, and policy aspects of these issues. Prerequisites: course work or experience in at least one of the following: silviculture, business analysis/planning, or policy/law. Enrollment is limited. Bradford S. Gentry, Mark Ashton, and guest lecturers

F&ES 80157b/ANTH 598b, Social Science of Development and Conservation: Advanced Readings 3 credits. An advanced seminar on the social science theory of sustainable development and conservation, intended for students interested in research design and policy planning in this field. It traces the conceptual history of the ideas of progress and development from the colonial period through the present and examines how these ideas are used by the parties who fund, design, and manage development projects. Topics discussed vary from year to year in response to current debates and events, but in the past have included the idea of poverty, the politics of mapping, microcredit and the entrepreneurial subject, image-making in development and conservation, changing ideas of nature, and governmentality in development and conservation. Students are expected to use

the course to develop, and present in class, their own research and writing.

Prerequisite: F&ES 83050a or F&ES 83056a. Three hours lecture/seminar.

Enrollment limited to twelve. Carol Carpenter

F&ES 83050a/ANTH 581a, Society and Environment: Introduction to Theory and Method 3 credits. This is an introductory, graduate core course on the scope of social scientific contributions to environmental and natural resource issues. It is designed to be the first course for students who will be specializing in social science approaches as well as the last/only course for students who take only one course in this area. The approach taken in the course is inductive, problem-oriented, and case study-based. Section I pre-sents an overview of the field and course. Section II deals with the way that environmental problems are initially framed. Case studies focus on placing problems in their wider political context, new approaches to uncertainty and failure, and the importance of how the analytical boundaries to resource systems are drawn. Section III focuses on questions of method, including the dynamics of working within development projects, and the art of rapid appraisal and short-term consultancies. Section IV is concerned with local peoples and the environment, with case studies addressing the myth of slash-and-burn cultivation, livestock and development discourse, and indigenous knowledge and its transformation. Section V presents lessons learned. No prerequisites. The course is a prerequisite for advanced seminars in social ecology in F&ES. Three-hour lecture/seminar. Enrollment limited to thirty. Michael R. Dove

F&ES 83073b/ANTH 582b, Households, Communities, Gender (for Development and Conservation) 3 credits. The implementation of development and conservation projects involving people requires an understanding of households, communities, and gender; unfortunately, policy is laden with mistaken assumptions about these social units. This course examines both the anthropology of households, communities, and gender, and common assumptions about them in development and conservation. Economic and political aspects of relations within these units are intimately linked, and are examined together. Important global variations in the structure of households,

communities, and gender exist, and are explored in the course. The structure of households, communities, and gender in any particular locality influences the economic and political relation with its region, nation, and the world system—with essential implications for development and conservation. The course aims to study local social units in order to understand their importance for regional, national, and global development and conservation. The goal is to encourage future policy makers and implementers to examine their assumptions about society, and to think more critically about the implications of these social units (and their variations around the world) for development and conservation. No prerequisites. Three hours lecture/seminar. Carol Carpenter

F&ES 84001a, Economics of Pollution 3 credits. This course is designed to teach students how to manage pollution. It explains why market economies fail to manage pollution efficiently and how to design efficient regulations. The first part of the course reviews the economic theory of pollution control. The second part reviews integrated assessment and demonstrates how economics and natural sciences need to be interwoven to obtain empirical estimates of the costs and damages of pollution. The final part of the course, led by students, reviews existing legislation and discusses whether existing laws are efficient and how they could be amended. Robert Mendelsohn

F&ES 86024b, Transportation and the Urban Future 3 credits. The focus of this course is on the environmental impacts of alternative transportation and urban land use policies, taught from a policy maker's perspective. It begins with a historical overview, examining the profound changes in the structure of cities following the advent of the automobile. The course then focuses on present and future environmental impacts—such as air pollution, greenhouse gas emissions, and urban sprawl—resulting from the exponential growth in motor vehicles, particularly in developing country cities, and examines alternative scenarios for mitigating these impacts. Additional topics include the future of public transit in the United States and the differing approaches to transportation and land use planning in various European cities; in-depth case studies of the success stories in urban transit in the developing world, particularly in regard to bus rapid

transit systems (BRTs) (e.g., Bogotá and Curitiba); and the range of options for transporting the two billion new urban inhabitants to be added to the world's cities in the next quarter-century. The course also examines policies to create compact, regional cities through the integration of transportation and land use planning, and focuses on next and future steps, including congestion pricing, and development of low-carbon fuel infrastructure and advanced vehicle technologies. Active student participation is required, including individual class presentations and a final group project. Ellen Brennan-Galvin

F&ES 86059a, Cities and Sustainability in the Developing World 3 credits. Most population growth in the twenty-first century will occur in the urban areas of the developing world, which are expected to increase by 2 billion inhabitants by 2030. Urban living poses environmental hazards, which affect the current population and especially the poor, through immediate, local impacts on health and safety. It also causes environmental degradation, with longer-term, wider-area, and intergenerational consequences. Variations in the incidence and relative severity of a range of environmental problems across cities at different levels of development suggest differences in priorities for action. The massive new investment in the capital stock of cities required for the doubling of urban population by 2030 will be critical to environmental outcomes. Using a number of city case studies, the course highlights local solutions, as well as new technologies for monitoring, planning, and managing urban growth. Active student participation is required, including individual class presentations and a final group project. Ellen Brennan-Galvin

F&ES 90025b/SOCY 535b, Consumption and Sustainability 3 credits. This course addresses the role of consumption in achieving sustainability, considering challenges such as the scale of consumption in the global north, the adoption of high-impact life styles in the global south, and the role of particular high-impact goods and services. The subtext of much of the discussion to date has been about how difficult it is to affect the trajectory and composition of consumption. However, a look at the historical path of consumer cultures reveals that they are dynamic, multifaceted, and complex entities, with numerous possibilities for

transformation. The course begins with the socio-cultural approach to consumer culture, and particularly the work of Pierre Bourdieu. We also consider the consumption and identity, the global expansion of consumer culture, and the literature on habit and routine. In the second section of the course we look at the ecologically significant cases of food, energy, and life style, and consider developments such as the slow food movement, personal carbon trading allowances, downshifting, and cultural conflicts about energy use and vehicles (hybrids vs. Hummers). The final section is on the politics of sustainable consumption, and the movement for ethical, or ecologically responsible, consumption. The course develops basic fluency in the rapidly growing field of sustainable consumption, with an emphasis on the major paradigms. Juliet Schor

F&ES 90116b, Caribbean Coastal Development: Cesium and CZM 3 credits. A field-intensive seminar exploring human-ecosystem interactions at the land-sea interface in the Caribbean, with St. Thomas, Virgin Islands, as the study site. Many tropical islands are undergoing rapid, uncontrolled development, placing severe local stress on several unique and vulnerable ecosystem types. In addition, human-induced environmental changes on scales up to global also impose stresses. This course examines the normal functioning of these ecosystems, scientific methods to evaluate and characterize ecosystem condition and processes, how human activities interfere with natural cycles in biophysical systems, and what management and policy tools can be applied to reduce impacts. An organizing framework for the course is the close coupling of coastal watersheds and adjacent marine ecosystems, especially coral reefs. A major part of the course is a one-week field trip to St. Thomas in the U.S. Virgin Islands during spring break. We also meet twice each week before the break to discuss readings and arrange logistics. Student presentations and projects. Class enrollment is limited to eight, and priority is given to second-year F&ES students, with others admitted as space permits. Students are selected in December of the preceding term. Gaboury Benoit

F&ES 90122b, Ecological Urbanism 3 credits. This course lays the groundwork for students from the School of Architecture and F&ES to collaboratively explore

and define ecologically based urban design. The course consists of three phases—an overview, a research and analysis phase, and a production phase. During phase one, students review existing urban ecological data and current methods for analyzing urban ecosystems on multiple scales. Students also study precedents for ecological urbanism such as manufactured nature, green infrastructure, and landscape urbanism as well as broader ecological concepts applied to coupled human-natural systems. During phase two, interdisciplinary teams select urbanization processes as case studies and work together focusing on history, invention, ad hoc growth, planning, and design. Students identify existing urban data on their case studies and seek innovative strategies to generate further data. Teams work to define their case studies in terms of urban ecology. During the final segment, students build on their site analysis exercises to generate urban design proposals. Proposals are ecologically driven and explore options for the kinds of urban forms or aesthetics that result from integrating ecological data and analysis with city planning and design. Alexander Felson