ARCHITECTURE (COURSE 4)

Architecture Design

4.021 Introduction to Architecture Design
Prereq: None
U (Fall)
3-3-6 units. HASS-A
Credit cannot also be received for 4.02A

Provides an introduction to the architecture design process. Develops skills that enable design creativity, thinking, representation, and development. Beginning with abstract exercises, introduces techniques for designing and developing 2-dimensional and 3-dimensional form and space in architecture.
L. Bello, A. Garcia-Abril

4.022 Architecture Design Foundations
Prereq: None
U (Spring)
3-3-6 units

Provides the foundations for architectural design. Focuses on design methodologies, formal and spatial analysis and the translation of creative conceptual strategies into architectural design propositions. Instruction in design skills, including digital and analogue representational techniques.
Architecture Design Staff

4.023 Architecture Design Studio I
Prereq: 4.021, 4.022
U (Fall)
0-12-12 units

Provides instruction in architectural design and project development within design constraints including architectural program and site. Students engage the design process through various 2-dimensional and 3-dimensional media. Working directly with representational and model making techniques, students gain experience in the conceptual, formal, spatial and material aspects of architecture. Instruction and practice in oral and written communication provided.
R. Murphy, C. Abbanat

4.024 Architecture Design Studio II
Prereq: 4.023, 4.401, 4.500
U (Spring)
0-12-12 units

Provides instruction in architectural design and project development with an emphasis on social, cultural, or civic programs. Builds on foundational design skills with more complex constraints and contexts. Integrates aspects of architectural theory, building technology, and computation into the design process.
Architecture Design Staff

4.025 Architecture Design Studio III
Prereq: 4.024, 4.440[J]
U (Fall)
0-12-12 units

Provides instruction in more advanced architectural design projects. Students develop integrated design skills as they negotiate the complex issues of program, site, and form in a specific cultural context. Focuses on how architectural concepts and ideas translate into built environments that transform the public sphere. Studio designed to prepare students for graduate studies in the field.
J. Lamere

4.02A Introduction to Architecture Design Intensive
Prereq: None
U (IAP)
2-5-2 units. HASS-A
Credit cannot also be received for 4.02A

Provides an introduction to the architecture design process. Develops skills that enable design creativity, thinking, representation, and development. Beginning with abstract exercises, introduces techniques for designing and developing 2-dimensional and 3-dimensional form and space in architecture.
L. Bello

4.100 Architecture Workshop: Form and Material
Prereq: None
U (IAP)
0-3-0 units

Intensive design and fabrication workshop in which students create models and half-size prototypes that explore the characteristics of concrete and wood. Examines the behavior of these materials and their inherent structural qualities. Studies how architectural detail can impact the perception and creation of larger built structures and environments. Lab fee.
M. Kuhn
4.101 Exploring Design: Thinking through Making  
Prereq: None  
U (Spring)  
0-3-6 units  
Introduces the creative design process through acts of making. Studio environment provides a dynamic laboratory to explore ideas related to form, space, materials, systems, and structures through physical, project-based activities. Emphasizes the translation of concepts into constructs--thinking through making, and making through thinking. Taught by faculty across art, design, architecture and technology disciplines, the class exposes students to a unique cross-section of design inquiry.  
*C. Mueller, S. Tibbits*

4.105 Geometric Disciplines and Architecture Skills I  
Prereq: Permission of instructor  
G (Fall)  
2-2-5 units  
Intensive introduction to architectural design tools and process, taught through a series of short exercises. Together with 4.107, covers a broad range of topics relating to the discourse of geometry as the basis of architectural design process. Focuses on projective drawings, explicit 3D modeling, and the reciprocity between representation and materialization. Lectures, workshops, and pin-ups address the architectural arguments intrinsic to geometry and its representation.  
J. Lamere

4.107 Geometric Disciplines and Architecture Skills II  
Prereq: 4.105  
G (Spring)  
2-2-5 units  
Intensive investigation of advanced architectural design tools and process, taught through a series of progressive exercises. Together with 4.105, covers a broad range of topics relating to the discourse of geometry as the basis of architectural design process. Focuses on contemporary digital modeling tools, including parametric and solver-based modeling and their relationship to digital fabrication. Lectures, workshops, and pin-ups address the architectural implications of simulations and innovative means of making.  
*Architecture Design Staff*

4.109 Materials and Fabrication for Architecture  
Prereq: Permission of instructor  
G (IAP)  
0-3-6 units  
Provides the material system knowledge and fabrication process skills to successfully engage with all areas of the shop, from precision handwork to multi-axis computer numerically controlled (CNC) machining. Progresses through a series of basic exercises that introduce the material and workflow, concluding with more complex problems that explore opportunities and issues specific to architecture. Lab fee.  
J. Lavallee

4.110[J] Design Across Scales and Disciplines  
Same subject as MAS.330[J]  
Subject meets with MAS.650  
Prereq: None  
U (Spring)  
2-2-8 units. HASS-A  
Inspired by Charles and Ray Eames’ canonical Powers of Ten, explores the relationship between science and engineering through the lens of design. Examines how transformations in science and technology have influenced design thinking and vice versa. Provides interdisciplinary skills and methods to represent, model, design and fabricate objects, machines, and systems using new computational and fabrication tools. Aims to develop methodologies for design research of interdisciplinary problems. Additional work required of students taking the graduate version of the subject.  
N. Oxman, J. M. Yoon

4.119 Preparation for Undergraduate Architecture Design Thesis  
Prereq: 4.024  
U (Fall)  
1-0-2 units  
Selection of thesis topic, defining method of approach, and preparation of thesis proposal for BSA degree in architecture. Weekly class meeting as well as individual conference with faculty.  
L. Bello
4.120 Furniture Making Workshop
Prereq: Permission of instructor
G (Fall)
2-2-5 units
Provides instruction in designing and building a functional piece of furniture from an original design. Develops woodworking techniques from use of traditional hand tools to digital fabrication. Gives students the opportunity to practice design without using a building program or code. Surveys the history of furniture making and includes site visits to local collections and artists/craftsmen.
C. Dewart

4.130 Architectural Design Theory and Methodologies
Prereq: Permission of instructor
G (Fall)
3-3-6 units
Can be repeated for credit.
Studies design as an interrogative technique to examine material sciences, media arts and technology, cultural studies, computation and emerging fabrication protocols. Provides in-depth, theoretical grounding to the notion of ‘design’ in architecture, and to the consideration of contemporary design methodologies, while encouraging speculation on emerging design thinking. Topical focus varies with instructor. May be repeated for credit with permission of department.
W. O’Brien

4.140[J] How to Make (Almost) Anything
Same subject as MAS.863[J]
Prereq: Permission of instructor
G (Fall)
3-9-0 units
See description under subject MAS.863[J].
N. Gershenfeld, J. DiFrancesco, S. Tibbits

4.151 Architecture Design Core Studio I
Prereq: Permission of instructor
G (Fall)
0-12-9 units
Establishes foundational processes, techniques and attitudes towards architectural design. Includes projects of increasing scope and complexity engaging issues of structure, circulation, program, organization, building systems, materiality and tectonics. Develops methods of representation that incorporate both analogue and digital drawings and models. First in a sequence of design subjects, which must be taken in order.
B. Clifford, W. O’Brien

4.152 Architecture Design Core Studio II
Prereq: 4.151
G (Spring)
0-12-9 units
Builds on Core I skills and expands the constraints of the architectural problem to include issues of urban site logistics, cultural and programmatic material (inhabitation and human factors), and long span structures. Two related projects introduce a range of disciplinary issues, such as working with precedents, site, sectional and spatial proposition of the building, and the performance of the outer envelope. Emphasizes the clarity of intentions and the development of appropriate architectural and representational solutions.
Architecture Design Staff

4.153 Architecture Design Core Studio III
Prereq: 4.152
G (Fall)
0-12-9 units
Interdisciplinary approach to design through studio design problems that engage the domains of building technology, computation, and the cultural/historical geographies of energy. Uses different modalities of thought to examine architectural agendas for ‘sustainability’; students position their work with respect to a broader understanding of the environment and its relationship to society and technology. Students develop a project with a comprehensive approach to programmatic organization, energy load considerations, building material assemblies, exterior envelope and structure systems.
A. Anmahian, S. Kennedy, A. Scott

4.154 Architecture Design Option Studio
Prereq: 4.153
G (Fall, Spring)
0-10-11 units
Can be repeated for credit.
Offers a broad range of advanced-level investigations in architectural design in various contexts, including international sites. Integrates theoretical and technological discourses into specific topics. Studio problems may include urbanism and city scale strategies, habitation and urban housing systems, architecture in landscapes, material investigations and new production technologies, programmatic and spatial complex building typologies, and research centered studies.
A. D’Hooghe, J. De Smedt
4.162 Introductory Urban Design Studio
Prereq: Permission of instructor
G (Fall)
0-10-11 units
Can be repeated for credit.

Project-based introduction to urban observation, research, analysis, and design. Focuses on urban elements, urban and architectural interventions, and landscape in existing cities. Emphasizes city form, sustainability, and social conditions. Projects require both conventional and digital techniques.
M. Mazereeuw

4.163[J] Urban Design Studio
Same subject as 11.332[J]
Prereq: 4.162 or permission of instructor
G (Fall, Spring)
Units arranged
Can be repeated for credit.

The design of urban environments. Strategies for change in large areas of cities, to be developed over time, involving different actors. Fitting forms into natural, man-made, historical, and cultural contexts; enabling desirable activity patterns; conceptualizing built form; providing infrastructure and service systems; guiding the sensory character of development. Involves architecture and planning students in joint work; requires individual designs or design and planning guidelines.
A. Berger, F. Masoud, A. Naude Santos

4.173[J] Beijing Urban Design Studio
Same subject as 11.307[J]
Prereq: Permission of instructor
Acad Year 2016-2017: G (Fall)
Acad Year 2017-2018: Not offered
0-18-0 units
See description under subject 11.307[J].
D. Frenchman, C. Zegras

4.180 Architectural Design Workshop
Prereq: 4.023 or permission of instructor
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

4.181 Architectural Design Workshop
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.

4.182 Architectural Design Workshop
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.

4.183-4.185 Architectural Design Workshop
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.

Addresses design inquiry in a studio format. In-depth consideration of selected issues of the built world. The problem may be prototypical or a particular aspect of a whole project, but is always interdisciplinary in nature.
M. Goulthorpe

4.189 Preparation for MArch Thesis
Prereq: Permission of instructor
G (Fall, Spring, Summer)
3-1-5 units
Can be repeated for credit.

Preparatory research development leading to a well-conceived proposition for the MArch design thesis. Students formulate a cohesive thesis argument and critical project using supportive research and case studies through a variety of representational media, critical traditions, and architectural/artistic conventions. Group study in seminar and studio format, with periodic reviews supplemented by conference with faculty and a designated committee member for each individual thesis.
Architecture Design Staff

4.190 Practical Experience in Architecture
Prereq: Permission of instructor
G (Fall)
0-0-3 units

Practical experience through summer internships secured by the student in the field of architecture, urbanism, digital design, art, or building technology.
Staff

4.191 Independent Study in Architecture Design
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.
4.192 Independent Study in Architecture Design  
Prereq: Permission of instructor  
U (Fall, IAP, Spring)  
Units arranged [P/D/F]  
Can be repeated for credit.

4.193 Independent Study in Architecture Design  
Prereq: Permission of instructor  
G (Fall, IAP, Spring)  
Units arranged  
Can be repeated for credit.

4.194 Independent Study in Architecture Design  
Prereq: Permission of instructor  
G (Fall, IAP, Spring)  
Units arranged [P/D/F]  
Can be repeated for credit.

Supplementary work on individual or group basis. Registration subject to prior arrangement for subject matter and supervision by staff.  
Architecture Design Staff

4.510 Special Subject: Architecture Design  
Prereq: None  
U (Spring)  
Not offered regularly; consult department  
Units arranged  
Can be repeated for credit.

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

4.512 Special Subject: Architecture Design  
Prereq: Permission of instructor  
G (Fall, IAP, Spring)  
Not offered regularly; consult department  
Units arranged  
Can be repeated for credit.

4.513 Special Subject: Architecture Design  
Prereq: Permission of instructor  
G (IAP, Spring)  
Not offered regularly; consult department  
Units arranged  
Can be repeated for credit.

4.514 Special Subject: Architecture Design  
Prereq: Permission of instructor  
G (IAP, Spring)  
Not offered regularly; consult department  
Units arranged [P/D/F]  
Can be repeated for credit.

Seminar or lecture on a topic in architecture design that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.  
Architecture Design Staff

Architecture Studies

4.210 Precedents in Critical Practice  
Prereq: None  
G (Fall)  
3-0-6 units  
Through formal analysis and discussion of historical and theoretical texts, seminar produces a map of contemporary architectural practice. Examines six pairs of themes in terms of their recent history: city and global economy, urban plan and map of operations, program and performance, drawing and scripting, image and surface, and utopia and projection.  
A. Miljacki

4.211[J] The Once and Future City  
Same subject as 11.016[J]  
Prereq: None  
U (Spring)  
3-0-9 units. HASS-H; CI-H  
See description under subject 11.016[J].  
A. Spirn

4.213[J] Ecological Urbanism Seminar  
Same subject as 11.308[J]  
Prereq: Permission of instructor  
G (Fall)  
3-0-9 units  
See description under subject 11.308[J].  
A. Spirn
4.214[J] Water, Landscape and Urban Design
Same subject as 11.314[J]
Prereq: Permission of instructor
Acad Year 2016-2017: G (Fall)
Acad Year 2017-2018: Not offered
3-3-6 units
Can be repeated for credit.

Workshop surveys how water affects the design of buildings, landscapes and cities in aesthetic, functional and symbolic ways. Combines the systematic study of water issues with urban design projects in South Asia and the US. Covers topics such as rainwater harvesting, water use efficiency, wastewater reuse, stormwater management, floodplain design, constructed wetlands, and waterfront development. Students work together to integrate these design concepts at the site, urban, and international scales.

J. Wescoat

4.215[J] Sensing Place: Photography as Inquiry
Same subject as 11.309[J]
Prereq: None
G (Fall)
3-0-9 units

See description under subject 11.309[J].

A. Spirn

4.216[J] Landscape and Urban Heritage Conservation
Same subject as 11.316[J]
Prereq: Permission of instructor
Acad Year 2016-2017: G (Spring)
Acad Year 2017-2018: Not offered
3-3-6 units
Can be repeated for credit.

Focuses on cultural landscape history, theory, and heritage issues and projects in the Indo-Islamic realm. Landscape and urban heritage inquiry go beyond monuments to encompass sites, cites, and regions. Combines the study of conservation theory and practice with an exploration of active urban landscape planning and design projects.

J. Wescoat

4.217[J] Disaster Resilient Design
Same subject as 11.315[J]
Prereq: None
Acad Year 2016-2017: G (Fall)
Acad Year 2017-2018: Not offered
3-0-6 units

Seminar examines the linkages between natural hazards and environmental design. Engages theoretical debates about landscapes of risk, vulnerability, and resilience. Participants generate proposals for disaster resilience through combinations of retrofit, reconstruction, resettlement, commemorative, and anticipatory design. Methods include rapid bibliographic search, risk analysis, landscape synthesis, and comparative international methods. Projects vary and may focus on current crises or involve collaboration with the Aga Khan Development Network and other humanitarian organizations.

J. Wescoat

4.221 Architecture Studies Colloquium
Prereq: Permission of instructor
G (Fall)
2-1-3 units

Series of open lectures, presented as an introduction to the diverse academic and creative community of MIT and the region, at which discipline groups of the SMArchS program converge and exchange ideas. Organized thematically, guest speakers from cultural and scientific fields present viewpoints in areas of emerging interest within design, building technology, architectural computation, history, and art. Encourages discourse with speakers and among students from different disciplines. Students initiate online debates among their peers and respond to an evolving series of discussions resulting in publication.

R. Ghosn, T. Hyde, S. Kennedy

4.222 Professional Practice
Prereq: Permission of instructor
G (Fall)
3-0-3 units

Gives a critical orientation towards a career in architectural practice. Uses historical and current examples to illustrate the legal, ethical and management concepts underlying the practice of architecture. Emphasis on facilitating design excellence and strengthening connections between the profession and academia.

P. Freelon
4.225 Urban Design Theory  
Prereq: Permission of instructor  
G (Fall)  
3.0-6 units  
Introduces theories, concepts and precedents in urban design. Emphasizes traditional, modern and contemporary values and approaches to urban design. Research projects required.  
M. Dennis

4.230[J] SIGUS Workshop  
Same subject as 11.468[J]  
Subject meets with 4.231  
Prereq: Permission of instructor  
G (Fall, IAP)  
Units arranged  
Can be repeated for credit.

4.231 SIGUS Workshop  
Subject meets with 4.230[J], 11.468[J]  
Prereq: Permission of instructor  
U (Fall, IAP)  
Units arranged  
Can be repeated for credit.  
Interdisciplinary projects and interactive practices in urban settlement issues as investigated by MIT’s SIGUS (Special Interest Group in Urban Settlements), with a focus on developing countries throughout the world. Participation by guest practitioners. Additional work required of students taking the graduate version.  
R. Goethert

Same subject as 11.444[J]  
Subject meets with 4.233  
Prereq: Permission of instructor  
G (Spring)  
3.0-6 units  
Considers a new interdisciplinary paradigm of practice that regards dialogue among practitioners and users essential for efficacious and creative design and planning process. Focuses on non-traditional client groups: communities, the poor, and the generally excluded middle-income. Explores key issues confronting development practitioners, with stress on practical exercises drawn from current national and international case studies; e.g., an investigative comparison of cities or tools in coping with impending rapid and massive growth and expansion. Engages those with a design and community service orientation. Additional work required of students taking the graduate version.  
R. Goethert

4.233 The New Global Planning Practitioner  
Subject meets with 4.232[J], 11.444[J]  
Prereq: Permission of instructor  
U (Spring)  
3.0-6 units  
Considers a new interdisciplinary paradigm of practice that regards dialogue among practitioners and users essential for efficacious and creative design and planning process. Focuses on non-traditional client groups: communities, the poor, and the generally excluded middle-income. Explores key issues confronting development practitioners, with stress on practical exercises drawn from current national and international case studies; e.g., an investigative comparison of cities or tools in coping with impending rapid and massive growth and expansion. Engages those with a design and community service orientation. Additional work required of students taking the graduate version.  
R. Goethert

4.236[J] Structuring Low-Income Housing Projects in Developing Countries  
Same subject as 11.463[J]  
Prereq: Permission of instructor  
G (Fall)  
3.0-9 units  
Examines dynamic relationship among key actors: beneficiaries, government, and funder. Emphasis on cost recovery, affordability, replicability, user selection, and project administration. Extensive case examples provide basis for comparisons.  
R. Goethert

4.240[J] Urban Design Skills: Observing, Interpreting, and Representing the City  
Same subject as 11.328[J]  
Prereq: None  
G (Fall)  
4.0-9 units  
See description under subject 11.328[J].  
S. Gray, M. A. Ocampo
Same subject as 11.330[J]
Subject meets with 4.251
Prereq: 4.252[J] or 11.001[J]
G (Spring)
Units arranged
Examines the complex development of cities through history by tracing a diachronic accumulation of forms and spaces in specific cities, and showing how significant ideas were made manifest across distinct geographies and cultures. Emphasizes how economic, spiritual, political, geographic and technological forces have simultaneously shaped and, in turn, been influenced by the city. Additional work required of students taking graduate version.
L. Jacobi, R. Segal

4.244[J] Urban Design Seminar: Perspectives on Contemporary Practice
Same subject as 11.333[J]
Prereq: None
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Spring)
2-0-7 units
See description under subject 11.333[J].
J. Samper

4.247[J] Urban Design Ideals and Action
Same subject as 11.337[J]
Prereq: 11.301[J] or permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Spring)
2-0-7 units
See description under subject 11.337[J].
B. Ryan

4.250[J] Introduction to Urban Design and Development
Same subject as 11.001[J]
Prereq: None
U (Fall)
3-0-9 units. HASS-H
Examines the evolving structure of cities and the way that cities, suburbs, and metropolitan areas can be designed and developed. Surveys the ideas of a wide range of people who have addressed urban problems. Stresses the connection between values and design. Demonstrates how physical, social, political and economic forces interact to shape and reshape cities over time.
L. Vale

4.251 The Making of Cities
Subject meets with 4.241[J], 11.330[J]
Prereq: Permission of instructor
U (Spring)
3-0-9 units
Examines the complex development of cities through history by tracing a diachronic accumulation of forms and spaces in specific cities, and showing how significant ideas were made manifest across distinct geographies and cultures. Emphasizes how economic, spiritual, political, geographic and technological forces have simultaneously shaped and, in turn, been influenced by the city. Additional work required of students taking graduate version.
L. Jacobi, R. Segal

4.252[J] Introduction to Urban Design and Development
Same subject as 11.301[J]
Prereq: Permission of instructor
G (Fall)
3-0-9 units
Examines both the structure of cities and ways they can be changed. Includes historical forces that have produced cities, models of urban analysis, contemporary theories of urban design, implementation strategies. Core lectures supplemented by discussion sessions focusing on student work and field trips. Guest speakers present cases involving current projects illustrating the scope and methods of urban design practice.
D. Frenchman

4.253[J] Urban Design Politics
Same subject as 11.302[J]
Prereq: Permission of instructor
G (Spring)
3-0-9 units
See description under subject 11.302[J].
L. Vale

Same subject as 11.303[J]
Prereq: Permission of instructor
G (Spring)
6-0-12 units
See description under subject 11.303[J].
D. Frenchman, P. Roth
4.255[J] Site and Environmental Systems Planning
Same subject as 11.304[J]
Prereq: Permission of instructor
G (Spring)
6-0-9 units
See description under subject 11.304[J].
M. A. Ocampo

4.264[J] Advanced Seminar in Landscape and Urbanism
Same subject as 11.334[J]
Prereq: Permission of instructor
G (Spring)
3-0-9 units
See description under subject 11.334[J].
A. Berger

4.274 Design Innovation for Distributed Energy
Prereq: Permission of instructor
G (Fall)
3-0-6 units
Explores design opportunities and technical challenges in the vertical integration of energy sector materials in designs for the built environment. Interdisciplinary design approach enables students to work directly with the selected energy harvesting materials to understand the performance attributes and their application value. Students investigate the spatial, social and environmental impacts of decentralized energy distribution through the development of design proposals and proof-of-concept application prototypes capable of providing measurable results. Engages research faculty outside of the School of Architecture and Planning.
S. Kennedy

4.280 Undergraduate Architecture Internship
Prereq: Permission of instructor
U (IAP)
Units arranged [P/D/F]
Can be repeated for credit.
Students work in an architect’s office to gain experience, improve skills, and see the inner workings of an everyday architectural practice. Internships possible in all sizes of firms and in public and nonprofit agencies. During IAP, a full-time, 4-week internship is required; maximum IAP credit, 6 units.
M. Kuhn

4.287 Graduate Architecture Internship
Prereq: Permission of instructor
G (IAP)
Units arranged [P/D/F]
Can be repeated for credit.
Work in an architect’s office to gain experience, improve skills, and see the inner workings of an everyday architectural practice. Internships possible in all sizes of firms and in public and nonprofit agencies. During IAP, a full-time, 4-week internship is required; maximum IAP credit, 6 units.
M. Kuhn

4.288 Preparation for SMArchS Thesis
Prereq: Permission of instructor
G (Fall, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.
Students select thesis topic, define method of approach, and prepare thesis proposal for SMArchS degree. Faculty supervision on an individual or group basis. Intended for SMArchS program students prior to registration for 4.THG.
Staff

4.291 Independent Study in Architecture Studies
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.

4.292 Independent Study in Architecture Studies
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

4.293 Independent Study in Architecture Studies
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.

4.294 Independent Study in Architecture Studies
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.
Supplementary work on individual or group basis. Registration subject to prior arrangement for subject matter and supervision by staff.
Architecture Studies Staff
4.299 Summer Research Topics
Prereq: Permission of instructor
G (Summer)
Units arranged [P/D/F]
Can be repeated for credit.

Supplementary summer work on individual basis. Registration subject to prior arrangement for subject matter and supervision by staff.

Staff

4.520 Special Subject: Architecture Studies
Prereq: None
U (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

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

4.522 Special Subject: Architecture Studies
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

4.523 Special Subject: Architecture Studies
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

4.524 Special Subject: Architecture Studies
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar or lecture on a topic in architecture studies that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.

Architecture Staff

4.525 Special Subject: Urban Housing
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in urban housing that is not covered in the regular architecture curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.

Architecture Staff

4.526 Special Subject: City Form
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in city form that is not covered in the regular architecture curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.

R. Ghosn

4.527 Special Subject: Urban Design
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in urban design that is not covered in the regular Architecture curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.

Architecture Staff
Art, Culture and Technology

4.301 Introduction to Artistic Experimentation
Prereq: None
U (Fall, Spring)
3-3-6 units. HASS-A

Introduces artistic practice and critical visual thinking through four studio-based projects on two selected scales or in two different media: “Body Extension,” “Shaping Time,” “Made Public,” and “Networked Cultures.” Each project concludes with a final presentation and critique. Students explore sculptural, architectural, or performative artistic methods; video and sound art; site interventions and strategies for artistic engagement in the public realm. Lectures, screenings, guest presentations, field trips, readings and debates supplement studio practice. Offers an index to the historic, cultural and environmental forces that affect both the development of an artistic vision and the reception of a work of art.
K. Nipper

4.302 Foundations in Art, Design, and Spatial Practices
Prereq: 4.021 or 4.02A
U (Spring)
3-3-6 units

Offers a foundation in artistic practice and its critical analysis. Emphasizes the development of artistic approaches and methods by drawing analogies to architectural thinking, urbanism, and design practice. Develops skills in communicating ideas and experiences on different scales and through two-dimensional, three-dimensional, time-based media, and new genres including artistic methods that engage the public realm through spatial, sculptural, performative and process-oriented practices. Includes video screenings, guest lectures, visiting artist presentations, and field trips. Instruction and practice in written and oral communication provided.
Art, Culture and Technology Staff

4.307 Art, Architecture, and Urbanism in Dialogue
Subject meets with 4.308
Prereq: 4.301, 4.302, or permission of instructor
U (Fall)
3-3-6 units

4.308 Art, Architecture, and Urbanism in Dialogue
Subject meets with 4.307
Prereq: None
G (Fall)
3-3-6 units

Initiates a dialogue between architecture, urbanism, and contemporary art. Focuses on interventions by practitioners who intertwine these three disciplines. Thematically investigates ideas ranging from the early modernist practices to the contemporary. Lectures, screenings, readings and discussions with guests and faculty lead to the development and realization of group and individual projects for final presentations. Additional work required of students taking graduate version.
Art, Culture and Technology Staff

4.312 Advanced Studio on the Production of Space
Subject meets with 4.313
Prereq: 4.301, 4.302, or permission of instructor
U (Fall)
3-3-3 units. HASS-A
Can be repeated for credit.

4.313 Advanced Studio on the Production of Space
Subject meets with 4.312
Prereq: None
G (Fall)
3-3-6 units
Can be repeated for credit.

Introduces historical and contemporary spatial concepts from various cultures and geo-political settings, and examines how they relate to artistic process and production. Explores the relational qualities of spatial concepts and reflects on their producers and proponents. Investigates the notion of utopian, dystopian and heterotopian space, inner and outer space, the void, the vacuum, the in-between, and the ‘real’ versus ‘virtual’ space. Screenings, guest speakers from various disciplines, readings and in-class presentations support the development of individual and collective projects. Additional work required of students taking the graduate version. Lectures, screenings, readings and discussions with guests and faculty lead to the development and realization of group and individual projects.
Art, Culture and Technology Staff

4.314 Advanced Workshop in Artistic Practice and Transdisciplinary Research
Subject meets with 4.315
Prereq: 4.301, 4.302, or permission of instructor
U (Spring)
3-3-6 units. HASS-A
Can be repeated for credit.
4.315 Advanced Workshop in Artistic Practice and Transdisciplinary Research
Subject meets with 4.314
Prereq: Permission of instructor
G (Spring)
3-3-6 units
Can be repeated for credit.
Examines artistic practice as a form of critical inquiry and knowledge production. Evaluates models of experimentation, individual research, and collaboration with other disciplines in the arts, culture, science and technology. Supports the development and supervision of individual and collective artistic research projects. Additional work required of students taking the graduate version. 
Art, Culture and Technology Staff

4.320 Introduction to Sound Creations
Subject meets with 4.321
Prereq: None
U (Spring)
3-3-6 units. HASS-A

4.321 Introduction to Sound Creations
Subject meets with 4.320
Prereq: None
G (Spring)
3-3-6 units
Develops appreciation and critical awareness of how sound as an artistic practice is performed, produced, and distributed. Explores contemporary and historical practices that emerge outside a purely musical environment. Investigates specific compositional developments of post-war modernity and electro-acoustic music as well as non-musical disciplines related to the psychophysics of hearing and listening. Additional work required of students taking the graduate version.
Art, Culture and Technology Staff

4.322 Introduction to Three-Dimensional Art Work
Subject meets with 4.323
Prereq: None
U (Fall)
3-3-6 units. HASS-A

4.323 Introduction to Three-Dimensional Art Work
Subject meets with 4.322
Prereq: None
G (Fall)
3-3-3 units
Explores three-dimensional artwork including sculptures and installations, from design to model to finished piece. Addresses theory, design, material and fabrication, process, context and site, and object’s relationship with the body and the physical or cultural environment. Lectures, screenings, field trips, readings and debates supplement studio practice. Additional work required of students taking graduate version.
Art, Culture and Technology Staff

4.330 Introduction to Networked Cultures and Participatory Media
Subject meets with 4.331
Prereq: None
U (Fall)
3-3-6 units. HASS-A

4.331 Introduction to Networked Cultures and Participatory Media
Subject meets with 4.330
Prereq: None
G (Fall)
3-3-6 units
Overview of participatory art practices, early net-art, net-activism, and current online practices in art and culture. Explores the cultural, social and political impacts of mediated communication. Examines how online communications has altered the way in which collaboration occurs, changes notions of authorship, and gives rise to the collective. Students implement, critique, and discuss design exercises and experiments and develop skills in media literacy and communication. Additional work required of students taking the graduate version.
Art, Culture and Technology Staff

4.332 Advanced Seminar in Networked Cultures and Participatory Media
Subject meets with 4.333
Prereq: 4.330 or permission of instructor
U (Spring)
3-3-6 units. HASS-A
4.333 Advanced Seminar in Networked Cultures and Participatory Media
Subject meets with 4.332
Prereq: 4.330, 4.331, or permission of instructor
G (Spring)
3-3-6 units

Provides the skills to create networked platforms and participatory media. Explores the development of new critical platforms and strategies, such as independent and alternative media, hybrid TV, blogs, and other social media. Develops advanced skills in media literacy and communications. Students implement, critique, and discuss design exercises and experiments. Additional work required of students taking the graduate version.

Art, Culture and Technology Staff

4.341 Introduction to Photography and Related Media
Subject meets with 4.342
Prereq: None
U (Fall, Spring)
3-3-6 units. HASS-A

4.342 Introduction to Photography and Related Media
Subject meets with 4.341
Prereq: Permission of instructor
G (Fall, Spring)
3-3-6 units

Introduces history and contemporary practices in artistic photography through projects, lectures, artist visits, group discussions, readings, and field trips. Fosters visual literacy and aesthetic appreciation of photography/digital imaging as well as a critical awareness of how images in our culture are produced and constructed. Provides practical instruction in the fundamentals of different camera formats, film exposure and development, lighting, black and white darkroom printing, and digital imaging. Assignments addressing a term-specific topic explore a range of traditional and experimental techniques, develop technical skills, and provide opportunity for personal exploration. Projects continuously presented and discussed in a critical forum. Additional work required of students taking the graduate version.

Art, Culture and Technology Staff

4.344 Advanced Photography and Related Media
Subject meets with 4.345
Prereq: 4.341 or permission of instructor
U (Fall, Spring)
3-2-4 units. HASS-A

Fosters critical awareness of how images in our culture are produced and constructed. Covers a range of experimental techniques and camera formats, advanced traditional and experimental black-and-white darkroom printing, and all aspects of digital imaging and output. Includes individual and group reviews, field trips, and visits from outside professionals. Topical focus changes each term; coursework centers on student-initiated project with emphasis on conceptual, theoretical, and technical development. Additional work required of students taking the graduate version. Equipment available for checkout.

L. Baladi

4.345 Advanced Photography and Related Media
Subject meets with 4.344
Prereq: 4.342 or permission of instructor
G (Fall, Spring)
3-2-4 units
Can be repeated for credit.

Fosters critical awareness of how images in our culture are produced and constructed. Covers a range of experimental techniques and camera formats, advanced traditional and experimental black-and-white darkroom printing, and all aspects of digital imaging and output. Includes individual and group reviews, field trips, and visits from outside professionals. Topical focus changes each term; coursework centers on student-initiated project with emphasis on conceptual, theoretical, and technical development. Additional work required of students taking the graduate version. Equipment available for checkout.

Art, Culture and Technology Staff

4.352 Advanced Video and Related Media
Subject meets with 4.353
Prereq: 4.354 or permission of instructor
U (Spring)
3-3-3 units. HASS-A
4.353 Advanced Video and Related Media
Subject meets with 4.352
Prereq: 4.355 or permission of instructor
G (Spring)
3-3-6 units
Introduction to advanced strategies of image and sound manipulation, both technical and conceptual. Covers pre-production planning (storyboards, scripting), refinement of digital editing techniques, visual effects such as chroma-keying, and post-production, as well as audio and sonic components. Context provided by regular viewings of contemporary video artworks and other audio-visual formats. Students work individually and in groups to develop skills in media literacy and communication. Additional work required of those taking the graduate version. Art, Culture and Technology Staff

4.354 Introduction to Video and Related Media
Subject meets with 4.355
Prereq: None
U (Fall)
3-3-6 units. HASS-A

4.355 Introduction to Video and Related Media
Subject meets with 4.354
Prereq: None
G (Fall)
Units arranged
Examies the technical and conceptual variables and strategies inherent in contemporary video art practice. Analyzes structural concepts of time, space, perspective and sound within the art form. Building upon the historical legacy of moving the image, students consider self-exploration, performance, social critique, and manipulation of raw experience into an aesthetic form. Emphasizes practical knowledge of lighting, video capturing and editing, and montage. Presentation and critique of student work, technical workshops, screenings, and reading discussions assist students with final project. Student taking graduate version complete additional assignments. Art, Culture and Technology Staff

4.356 Cinematic Migrations
Subject meets with 4.357
Prereq: 4.301, 4.302, 4.354 or permission of instructor
U (Fall)
3-3-6 units. HASS-A
Explores ideas and contexts behind moving images through a multifaceted look at cinema's transmutations, emergence on local and national levels, and global migrations. Examines the transformation caused by online video, television, spatial installations, performances, dance, and many formats and portable devices. Examines the theory and context of film’s categorization, dissemination and analysis. Presentations, screenings, field trips, readings, visiting artists, and experimental transdisciplinary projects are designed to broaden the perception of present cinema. Additional work required of students taking the graduate version. R. Green

4.357 Cinematic Migrations
Subject meets with 4.356
Prereq: 4.355 or permission of instructor
G (Fall)
3-3-6 units
Can be repeated for credit.

4.361 Performance Art Workshop
Subject meets with 4.362
Prereq: 4.301, 4.302, or permission of instructor
U (Fall)
3-3-6 units. HASS-A

4.362 Performance Art Workshop
Subject meets with 4.361
Prereq: None
G (Fall)
3-3-6 units
Surveys performance in relation to media and to spatial structures imagined as settings for narrative movements. Uses video to explore the perception of sounds and images and how they are altered by various devices. Students design visual forms and performative actions, and make props or objects that embody aspects of their narratives. Includes readings and screenings on the theoretical and historical background of performance art. Assignments lead to a final performance project. Additional work required of students taking graduate version. Art, Culture and Technology Staff

4.368 Studio Seminar in Public Art/Public Sphere
Subject meets with 4.369
Prereq: 4.301, 4.302, or permission of instructor
U (Spring)
3-3-6 units. HASS-A
4.369 Studio Seminar in Public Art/Public Sphere  
Subject meets with 4.368  
Prereq: None  
G (Spring)  
3-3-6 units  
Focuses on the production of artistic interventions in public space outside of the gallery or museum context. Explores the variety of ideas, situations, objects, and materials that shape public space. Traditional forms of commemoration are examined in comparison to temporal and critical forms of public art and action. Historical models include the Russian Constructivists, the Situationists International, conceptual art, and contemporary interventionist tactics and artistic strategies. Assigned readings and discussions help students develop an initial concept for a publicly diffused project. Additional work required of students taking graduate version.  
A. Muntadas

4.373 Advanced Projects in Visual Arts  
Subject meets with 4.374  
Prereq: 4.301, 4.302, or permission of instructor  
U (Spring)  
3-3-6 units. HASS-A  
Can be repeated for credit.

4.374 Advanced Projects in Visual Arts  
Subject meets with 4.373  
Prereq: Permission of instructor  
G (Spring)  
3-3-6 units  
Can be repeated for credit.  
Investigates conceptual and formal issues in a variety of media. Explores issues of representation, interpretation, and meaning, and how they relate to historical, social, and cultural context. Additional work required of students taking graduate version.  
Art, Culture and Technology Staff

4.388 Preparation for SMACT Thesis  
Prereq: Permission of instructor  
G (Spring, Summer)  
3-0-6 units  
Can be repeated for credit.  
Provides assistance to students as they select a thesis topic, develop a method of approach, prepare a proposal, and develop an outline for their thesis. Explores artistic practice as method of critical inquiry. Examines artists' writing and clarifies academic requirements and standards. Regular group meetings, including peer reviews, supplemented by independent study and individual conferences with faculty.  
Art, Culture and Technology Staff

4.389 Tutorial for SMACT Thesis  
Prereq: 4.388; Coreq: 4.THG  
G (Spring)  
3-0-6 units  
Can be repeated for credit.  
Includes regular presentations of students' writing in group critiques. Supports independent thesis research and thesis project by providing guidance in methodology supplemented by regular individual conferences with thesis committee members.  
Art, Culture and Technology Staff

4.390 Art, Culture and Technology Studio  
Prereq: Permission of instructor  
G (Fall, Spring)  
3-3-6 units  
Can be repeated for credit.  
Explores the theory and criticism of intersections between art, culture and technology in relation to contemporary artistic practice, critical design, and media. Considers methods of investigation, documentation, and display. Examines individual and collaborative practice, and explores modes of communication across disciplines. Students develop projects in which they organize research methods and goals, engage in production, cultivate a context for their practice, and explore how to successfully communicate, display and document their work. Regular presentations and critiques by peers, ACT faculty and fellows, and external guest reviewers.  
G. Urbonas

4.391 Independent Study in Art, Culture and Technology  
Prereq: Permission of instructor  
U (Fall, IAP, Spring)  
Units arranged  
Can be repeated for credit.

4.392 Independent Study in Art, Culture and Technology  
Prereq: Permission of instructor  
U (Fall, IAP, Spring)  
Units arranged [P/D/F]  
Can be repeated for credit.

4.393 Independent Study in Art, Culture and Technology  
Prereq: Permission of instructor  
G (Fall, IAP, Spring)  
Units arranged  
Can be repeated for credit.
4.394 Independent Study in Art, Culture and Technology
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

Supplementary work on individual basis. Registration subject to prior arrangement for subject matter and supervision by staff.
Art, Culture and Technology Staff

4.S30 Special Subject: Art, Culture and Technology
Prereq: None
U (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

4.S31 Special Subject: Art, Culture and Technology
Prereq: None
U (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

4.S32 Special Subject: Art, Culture and Technology
Prereq: Permission of instructor
G (Spring)
Units arranged
Can be repeated for credit.

4.S33 Special Subject: Art, Culture and Technology
Prereq: Permission of instructor
G (Spring)
Units arranged
Can be repeated for credit.

4.S34 Special Subject: Art, Culture and Technology
Prereq: Permission of instructor
G (Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar or lecture on a topic in visual arts that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
Art, Culture & Technology Staff

Building Technology

4.401 Environmental Technologies in Buildings
Prereq: None
U (Fall)
3-2-7 units
Credit cannot also be received for 4.464

Introduction to the study of the thermal and luminous behavior of buildings. Examines the basic scientific principles underlying these phenomena and introduces students to a range of technologies and analysis techniques for designing comfortable indoor environments. Challenges students to apply these techniques and explore the role energy and light can play in shaping architecture. Meets with 4.464 when offered concurrently. Additional work required of students taking the graduate version.
C. Reinhart

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

Focuses on the design, analysis, and application of technologies that support the construction of less expensive and better performing schools in developing countries. Prepares students to design or retrofit school buildings in partnership with local communities and NGOs. Strategies covered include daylighting, passive heating and cooling, improved indoor air quality via natural ventilation, appropriate material selection, and structural design. Investigations are based on application of engineering fundamentals, experiments and simulations. Case studies illustrate the role of technologies in reducing barriers to improved education.
L. K. Norford

Same subject as 1.044[J], 2.66[J]
Prereq: Physics I (GIR), Calculus II (GIR)
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: U (Fall)
3-2-7 units. REST

Design-based introduction to energy and thermo-sciences, with applications to sustainable, energy-efficient architecture and building technology. Covers introductory thermodynamics, air/water/vapor mixtures, and heat transfer. Studies leading order factors in building energy use. Includes several building design projects in which students creatively employ energy fundamentals and building energy use.
L. R. Glicksman
Same subject as 2.52[J]
Prereq: 2.51
Acad Year 2016-2017: G (Fall)
Acad Year 2017-2018: Not offered
3-0-9 units
See description under subject 2.52[J].
L. R. Glicksman

4.430 Daylighting and Solar Gain Control
Prereq: 4.464 or permission of instructor
Acad Year 2016-2017: G (Spring)
Acad Year 2017-2018: Not offered
Units arranged
Studies natural and electric lighting in an architectural context. Promotes the integration of occupant comfort, energy efficiency and daylight availability throughout the design process, with an emphasis on the role light can play in shaping architecture. Through group and individual projects, students practice design techniques, from rule of thumb simulations to high dynamic range photography and physical model building. Offered for 9 or 12 units.
C. Reinhart

4.431 Architectural Acoustics
Prereq: Permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Spring)
Units arranged
Describes interactions between people and sound, indoors and outdoors, and uses this information to develop acoustical design criteria for architecture and planning. Principles of sound generation, propagation, and reception. Properties of materials for sound absorption, reflection, and transmission. Design implications for performance and gathering spaces. Use of computer modeling techniques.
Building Technology Staff

4.432 Modeling Urban Energy Flows for Sustainable Cities and Neighborhoods
Subject meets with 4.433
Prereq: Permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: U (Spring)
3-2-7 units

4.433 Modeling Urban Energy Flows for Sustainable Cities and Neighborhoods
Subject meets with 4.432
Prereq: Permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Spring)
3-2-4 units
Studies energy flows in and around groups of buildings from individual structures to complete, large-scale neighborhoods. Students use digital techniques to analyze and influence building energy use, neighborhood walkability, and outdoor comfort. Group work focuses on the design of a sustainable, mixed-use urban neighborhood that successfully engages microclimatic effects, such as shading of neighboring buildings, urban heat island effects, and localized wind patterns. Additional work is required of students taking the graduate version.
C. Reinhart

4.440[J] Building Structural Systems I
Same subject as 1.056[J]
Subject meets with 4.462
Prereq: Calculus II (GIR)
U (Spring)
3-3-6 units. REST
Introduces the design and behavior of large-scale structures and structural materials. Emphasizes the development of structural form and the principles of structural design. Presents design methods for timber, masonry, concrete and steel applied to long-span roof systems, bridges, and high-rise buildings. Includes environmental assessment of structural systems and materials. In laboratory sessions, students solve structural problems by building and testing simple models. Graduate and undergraduate students have separate lab sections.
J. Ochsendorf

4.444 Analysis of Historic Structures
Subject meets with 1.574[J], 4.445[J]
Prereq: None
U (Spring)
3-0-9 units
Same subject as 1.574[J]  
Subject meets with 4.444  
Prereq: None  
G (Spring)  
3-0-6 units

Technical and historical study of structures in architecture and engineering. Focuses on the design and assessment of historic structures in masonry, timber, concrete, and metal. Course is driven by student research proposals. Previous student projects have researched Gothic flying buttresses, wooden covered bridges, Roman aqueducts, and iron train stations.  
*J. Ochsendorf*

**4.447[J] Design for Sustainability**  
Same subject as 1.819[J]  
Prereq: Permission of instructor  
G (Fall)  
2-0-4 units

See description under subject 1.819[J].  
*J. Ochsendorf*

**4.450 Computational Structural Design and Optimization**  
Prereq: Permission of instructor  
G (Fall)  
Units arranged

Research seminar focusing on cutting-edge applications of computation for creative, early-stage structural design and optimization for architecture. Incorporates computational design fundamentals, including problem parameterization and formulation; design space exploration strategies, including interactive, heuristic, and gradient-based optimization; and computational structural analysis methods, including the finite element method, graphic statics, and approximation techniques. Case studies introduce and investigate a range of historical and contemporary examples of structural optimization in theory and practice.  
*C. Mueller*

**4.461 Architectural Building Systems**  
Prereq: None  
G (Fall)  
3-1-5 units

Introduction to modern architectural systems and the materials and construction of their components and assemblies. Covers in detail building enclosure, structure, interior space, circulation and conveyance systems, and power and water distribution systems. Reviews technologies for response to climate, intelligent systems integration, passive and active heating and cooling, lighting and acoustics.  
*Building Technology Staff*

**4.462 Building Structural Systems I**  
Subject meets with 1.056[J], 4.440[J]  
Prereq: 4.461 or permission of instructor  
G (Spring)  
3-2-4 units

Introduces the design and behavior of large-scale structures and structural materials. Emphasizes the development of structural form and the principles of structural design. Introduces design methods for timber, masonry, concrete, and steel applied to long-span roof systems, bridges, and high-rise buildings. Includes environmental assessment of structural systems and materials. Laboratory to solve structural problems by building and testing simple models. Graduate and undergraduate students have separate lab sections.  
*J. Ochsendorf*

**4.463 Building Structural Systems II**  
Prereq: 4.440[J], 4.462, or permission of instructor  
G (Fall)  
3-2-4 units

Addresses advanced structures, exterior envelopes, and contemporary production technologies. Continues the exploration of structural elements and systems, expanding to include more complex determinate, indeterminate, long-span, and high-rise systems. Topics include reinforced concrete, steel and engineered-wood design, and an introduction to tensile systems. The contemporary exterior envelope is discussed with an emphasis on the classification of systems, performance attributes, and analysis techniques, material specifications and novel construction technologies.  
*C. Mueller*
4.464 Environmental Technologies in Buildings
Prereq: None
G (Fall, Spring)
3-2-4 units
Credit cannot also be received for 4.401

Introduction to the study of the thermal and luminous behavior of buildings. Examines the basic scientific principles underlying these phenomena and introduces students to a range of technologies and analysis techniques for designing comfortable indoor environments. Challenges students to apply these techniques and explore the role energy and light can play in shaping architecture. Meets with 4.401 when offered concurrently. Additional work required of students taking the graduate version.
Fall: C. Reinhart
Spring: L. Norford

4.473 Design Workshop for a Sustainable Future
Prereq: 4.151; 4.461 or permission of instructor
G (Spring)
3-0-6 units
Can be repeated for credit.

Focuses on strengthening the link between design and technology with an emphasis on sustainability concepts. Introduces theories behind resource-efficient built environments and how they can enhance the design process. Students explore ways to effectively integrate building performance goals, such as energy-efficiency, efficient material use, structural stability and occupant comfort into the design process.
J. Ochsendorf

4.475 Design for Sustainable Urban Futures
Prereq: 4.151; 4.461 or permission of instructor
G (Spring)
3-0-6 units

Focuses on understanding and assessing the resource intensity of urban centers. Introduces key concepts from ecological economics, and urban economics and ecology, while surveying the state of global resource extraction and consumption. Students develop focused, alternative urban scenarios that offer practical and effective potential for greater resource efficiencies. Explores the urban built environment, urban mobility, decentralized infrastructure, and other important alternative modes for production and consumption.
J. Fernandez

4.477 Emergent Materials
Prereq: None
Acad Year 2016-2017: G (Spring)
Acad Year 2017-2018: Not offered
Units arranged

Workshop reinterprets the function and application of various emerging building materials used in contemporary architectural constructs. Lectures address themes of resource efficiency and material selection within the context of emerging areas of research. Readings establish what is considered state-of-the-art and support the making of material prototypes. Offered for 9 or 12 units.
J. Fernandez

4.481 Building Technology Seminar
Prereq: Permission of instructor
G (Fall)
2-0-1 units

Fundamental research methodologies and ongoing investigations in building technology to support the development of student research projects. Topics drawn from low energy building design and thermal comfort, building systems analysis and control, daylighting, structural design and analysis, novel building materials and construction techniques and resource dynamics. Organized as a series of two- and three-week sessions that consider topics through readings, discussions, design and analysis projects, and student presentations.

4.488 Preparation for S.M.B.T. Thesis
Prereq: Permission of instructor
G (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

Building Technology Staff

4.489 Preparation for Building Technology Ph.D. Thesis
Prereq: Permission of instructor
G (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.

Building Technology Staff
4.491 Independent Study in Building Technology
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.

4.492 Independent Study in Building Technology
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

4.493 Independent Study in Building Technology
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.

4.494 Independent Study in Building Technology
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

Supplementary work on individual basis. Registration subject to prior arrangement for subject matter and supervision by staff.

Building Technology Staff

4.540 Special Subject: Building Technology
Prereq: None
U (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

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

4.542 Special Subject: Building Technology
Prereq: Permission of instructor
G (Fall)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

4.543 Special Subject: Building Technology
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.

4.544 Special Subject: Building Technology
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar or lecture on a topic in building technology that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.

Building Technology Staff

4.545 Special Subject: Building Construction
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in building construction that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.

Building Technology Staff

4.546 Special Subject: Energy in Buildings
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in energy in buildings that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.

Building Technology Staff
4.500 Introduction to Geometric Modeling
Prereq: None
U (Fall)
2-2-8 units
Introduces 3-D CAD modeling to students with little or no experience. Uses basic theories in generative modeling combined with a variety of modeling applications to explore surface, solid, and mesh modeling techniques. Presents a variety of input tools, from entry-level keyboard commands to 3-D scanning and CAD scripting. Design models created throughout the semester aid in exploration of a variety of output devices, such as paper-printed media, 3-D rendering, 3-D printing, and some CNC manufacturing. Includes weekly modeling assignments and a final project.
L. Sass

4.504 Design Scripting
Subject meets with 4.564
Prereq: 4.500
Acad Year 2016-2017: U (Spring)
Acad Year 2017-2018: Not offered
2-2-8 units
Introduces fundamental ideas of computer programming and demonstrates their application to the process of visual and spatial design. Teaches methods for algorithmically modeling visual and spatial forms, evaluating their conditions, building interface, and processing formal data for prototyping, manufacturing, rendering, and other design tools. Proceeds through a sequence of scripting exercises in application programming environments. Each exercise requires a student to articulate computational tasks in the context of a design, and to write codes that produce graphic solutions. Additional work required of students taking the graduate version.
T. Nagakura

4.501 Creative Design Prototyping
Prereq: 4.500
U (Spring)
2-2-8 units
Introduction to digital fabrication and online presentation as a single design process. Project-based class that integrates iterative design on paper with physical prototyping across many scales. Hands on learning of fabrication lab equipment integrated with design studio. It starts with machine learning through exercises quickly moving to a stepped design to production process: 3D printings, CNC machining and robotic finishing. The final product is an individually designed and fabricated functional piece of furniture.
L. Sass

4.502 Advanced Visualization: Architecture in Motion Graphics
Subject meets with 4.562
Prereq: 4.500 or permission of instructor
U (Fall)
3-2-7 units
Advanced projects in architectural visualization with an emphasis on the use of computer graphics animation and video production media. Workshop introduces advanced visualization software and teaches exploration of spatial expressions in motion graphics format. Students review and discuss selected literature and video materials on architecture and film. Additional work required of students taking the graduate version.
T. Nagakura

4.507 Special Subject: Architectural Lighting
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.
Seminar or lecture on a topic in architectural lighting that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
Building Technology Staff

4.508 Special Subject: Structural Design
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.
Seminar or lecture on a topic in structural design that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
J. Ochsendorf, M. West

Computation

4.500 Introduction to Geometric Modeling
Prereq: None
U (Fall)
2-2-8 units
Introduces 3-D CAD modeling to students with little or no experience. Uses basic theories in generative modeling combined with a variety of modeling applications to explore surface, solid, and mesh modeling techniques. Presents a variety of input tools, from entry-level keyboard commands to 3-D scanning and CAD scripting. Design models created throughout the semester aid in exploration of a variety of output devices, such as paper-printed media, 3-D rendering, 3-D printing, and some CNC manufacturing. Includes weekly modeling assignments and a final project.
L. Sass

4.504 Design Scripting
Subject meets with 4.564
Prereq: 4.500
Acad Year 2016-2017: U (Spring)
Acad Year 2017-2018: Not offered
2-2-8 units
Introduces fundamental ideas of computer programming and demonstrates their application to the process of visual and spatial design. Teaches methods for algorithmically modeling visual and spatial forms, evaluating their conditions, building interface, and processing formal data for prototyping, manufacturing, rendering, and other design tools. Proceeds through a sequence of scripting exercises in application programming environments. Each exercise requires a student to articulate computational tasks in the context of a design, and to write codes that produce graphic solutions. Additional work required of students taking the graduate version.
T. Nagakura
4.511 Advanced Projects in Digital Fabrication
Prereq: Permission of instructor
G (Spring)
Units arranged
Can be repeated for credit.

Independent projects in the study of digital fabrication as it relates to architecture design. Students propose a project within one of the following areas of investigation: new materials, software design for makers, fabrication based modeling, robotic fabrication.

L. Sass

4.517 Parametric and Building Information Modeling
Prereq: 4.500 or permission of instructor
G (Fall)
3-2-7 units

Addresses professional applications of digital modeling in the development of contemporary construction systems and practical applications of geometry and digital modeling used to realize built complex forms. Surveys digitally-founded professional engineering, construction, and fabrication practices through case studies, shop visits, and on-campus and videoconference lectures. Includes modeling and making exercises, case studies, and a final project that addresses digital system design, analysis, and fabrication.

D. Shelden

4.520 Visual Computing I
Subject meets with 4.521
Prereq: None
U (Fall)
3-0-9 units

4.521 Visual Computing I
Subject meets with 4.520
Prereq: None
G (Fall)
3-0-6 units

Introduces a visual-perceptual, rule-based approach to design using shape grammars. Covers grammar fundamentals through lectures and in-class, exercises. Focuses on shape grammar applications, from stylistic analysis to creative design, through presentations of past applications and through short student exercises and projects. Presents computer programs for automating shape grammars. Additional work required of students taking graduate version.

T. Knight

4.522 Visual Computing II
Subject meets with 4.523
Prereq: 4.520 or permission of instructor
U (Spring)
3-0-9 units

4.523 Visual Computing II
Subject meets with 4.522
Prereq: 4.520, 4.521 or permission of instructor
G (Spring)
3-0-6 units

Introduces advanced topics in shape grammar theory and applications. Includes an introductory component on shape grammars for students new to the area. Discusses generalizations of the shape grammar formalism that provide alternative ways of computing and representing designs. These include parametric grammars and parametric design, parallel grammars, and color grammars. Presents material through lectures and in-class, applied exercises. Additional work required of graduate students.

T. Knight

4.524 Introduction to Shape Grammars I
Prereq: None
G (Fall)
3-0-6 units

4.525 Introduction to Shape Grammars II
Prereq: 4.540
G (Spring)
3-0-6 units

An in-depth introduction to shape grammars and their applications in architecture and related areas of design. Shapes in the algebras Ui j, in the algebras Vi j and Wi j incorporating labels and weights, and in algebras formed as composites of these. Rules and computations. Shape and structure. Designs.

G. Stiny

4.526 Background to Shape Grammars
Prereq: 4.521 or permission of instructor
G (Spring)
3-0-6 units

Can be repeated for credit.

An advanced examination of the shape grammar formalism and its relationship to some key issues in a variety of other fields, including art and design, philosophy, history and philosophy of science, linguistics and psychology, literature and literary studies, logic and mathematics, and artificial intelligence. Student presentations and discussion of selected readings are encouraged. Topics vary from year to year. Can be repeated with permission of instructor.

G. Stiny
4.550 Computational Design Lab
Subject meets with 4.570
Prereq: Permission of instructor
U (Spring)
Units arranged
Can be repeated for credit.

4.552 Workshop in Architectural Computation
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

4.553 Workshop in Architectural Computation
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Opportunity for exploration of a topic in computation through research-focused design projects or exercises. Registration subject to prior arrangement of topic and supervision by staff.

Computation Staff

4.557[J] City Science
Same subject as MAS.552[J]
Prereq: Permission of instructor
G (Fall, Spring)
3-0-9 units
Can be repeated for credit.

See description under subject MAS.552[J].
K. Larson, R. Chin

4.561 Introduction to Building Information Modeling in Architecture
Prereq: Permission of instructor
G (Spring)
3-2-7 units

Addresses fundamental methods, theories, and practices that engage contemporary modeling tools in the context of architectural design. Introduces selected academic and professional topics through lectures, demonstrations, and assignments. Topics include parametric modeling, component types and assembly, prototyping, scripting, and simulations. Initiates intellectual explorations in the use of building information modeling in research projects and design practices.
T. Nagakura

4.562 Advanced Visualization: Architecture in Motion Graphics
Subject meets with 4.502
Prereq: Permission of instructor
G (Fall)
3-2-7 units

Advanced projects in architectural visualization with an emphasis on the use of computer graphics animation and video production media. Introduces advanced visualization software and teaches exploration of spatial expressions in motion graphics format. Students review and discuss selected literature and video materials on architecture and film. Additional work required of students taking the graduate version.
T. Nagakura

4.564 Design Scripting
Subject meets with 4.504
Prereq: Permission of instructor
Acad Year 2016-2017: G (Spring)
Acad Year 2017-2018: Not offered
2-2-8 units

Introduces fundamental ideas of computer programming and demonstrates their application to the process of visual and spatial design. Teaches methods for algorithmically modeling visual and spatial forms, evaluating their conditions, building interface, and processing formal data for prototyping, manufacturing, rendering, and other design tools. Proceeds through a sequence of scripting exercises in application programming environments. Each exercise requires a student to articulate computational tasks in the context of a design, and to write codes that produce graphic solutions. Additional work required of students taking the graduate version.
T. Nagakura

4.566 Advanced Projects in Digital Media
Prereq: 4.562, 4.564, or permission of instructor
G (Fall, Spring)
Units arranged
Can be repeated for credit.

Develop independent projects in the study of digital media as it relates to architectural design. Students propose a project topic such as digital design tool, modeling and visualization, motion graphics, design knowledge representation and media interface.
T. Nagakura
4.569[J] Designing Interactions
Same subject as CMS.834[J]
Subject meets with CMS.634
Prereq: None
G (Fall, Spring)
3-3-6 units
Can be repeated for credit.
See description under subject CMS.834[J].
F. Casalegno, T. Nagakura

4.570 Computational Design Lab
Subject meets with 4.550
Prereq: Permission of instructor
G (Spring)
Units arranged
Can be repeated for credit.
Provides students with an opportunity to explore projects that engage real world problems concerning spatial design, technology, media, and society. In collaboration with industry partners and public institutions, students identify topical issues and problems, and also explore and propose solutions through the development of new ideas, theories, tools, and prototypes. Industry and academic collaborators act as a source of expertise, and as clients and critics of projects developed during the term. General theme of workshop varies by semester or year. Open to students from diverse backgrounds in architecture and other design-related areas. Additional work required of students taking graduate version.
Computation Staff

4.580 Inquiry into Computation and Design
Prereq: None
G (Fall)
3-0-9 units
Explores the varied nature, history and practice of computation in design through lectures, readings, small projects, discussions, and guest visits by Computation group faculty and others. Topics may vary from year to year. Aims to help students develop a critical awareness of different approaches to and assumptions about computation in design beyond the specifics of techniques and tools, and to open avenues for further research.
T. Knight

4.581 Proseminar in Computation
Prereq: Permission of instructor
G (Fall)
3-0-9 units
Can be repeated for credit.
Introduction to traditions of research in design and computation scholarship.
G. Stiny

4.582 Research Seminar in Computation
Prereq: 4.580 or permission of instructor
G (Fall, Spring)
Units arranged [P/D/F]
Can be repeated for credit.
In-depth presentations of current research in design and computation.
G. Stiny

4.583 Forum in Computation
Prereq: Permission of Instructor
G (Fall, Spring)
3-0-0 units
Can be repeated for credit.
Group discussions and presentation of ongoing graduate student research in the Computation program.
T. Knight

4.584 Reading Seminar in Design and Computation
Prereq: Permission of instructor
G (Fall, Spring)
Units arranged [P/D/F]
Can be repeated for credit.
Reading and discussion of particular topics in design and computation. Students lead discussions, make oral presentations, and prepare reviews of weekly readings.
T. Knight

4.587 SMArchS Computation Pre-Thesis Preparation
Prereq: 4.221 or permission of instructor
G (Spring)
3-0-3 units
Preliminary study in preparation for the thesis for the SMArchS degree in Computation. Topics include literature search, precedents examination, thesis structure and typologies, and short writing exercise.
T. Knight, T. Nagakura
4.589 Preparation for Design and Computation PhD Thesis
Prereq: Permission of instructor
G (Fall, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.
Computational Staff

4.591 Independent Study in Architectural Computation
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.

4.592 Independent Study in Architectural Computation
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

4.593 Independent Study in Architectural Computation
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.

4.594 Independent Study in Architectural Computation
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.
Supplementary work on individual basis. Registration subject to prior arrangement for subject matter and supervision by staff.
Computational Staff

4.595 Special Subject: Architectural Computation
Prereq: None
U (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

4.596 Special Subject: Shape Grammars
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.
Seminar or lecture on a topic in computation and design that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
Computational Staff
History, Theory and Criticism of Architecture and Art

4.601 Introduction to Art History
Prereq: None
U (Fall)
3-2-7 units. HASS-A

Introduction to the history and interpretation of western art that explores painting, graphic arts and sculpture from the Renaissance to the present. Engages diverse methodological perspectives to examine changing conceptions of art and the artist, and to investigate the plural meaning of artworks within the larger contexts of culture and history. Subject includes trips to local museums.

K. Smentek

4.602 Modern Art and Mass Culture
Subject meets with 4.652
Prereq: None
Acad Year 2016-2017: U (Spring)
Acad Year 2017-2018: Not offered
4-0-8 units. HASS-A; CI-H

Introduction to theories of modernism and postmodernism and their related forms (roughly 18th century to present) in art and design. Focuses on how artists use the tension between fine art and mass culture to critique both. Examines visual art in a range of genres, from painting to design objects and "relational aesthetics." Works of art are viewed in their interaction with advertising, caricature, comics, graffiti, television, fashion, "primitive" art, propaganda, and networks on the internet. Additional work required of students taking graduate version.

C. Jones

4.603 Understanding Modern Architecture
Subject meets with 4.604
Prereq: None
U (Fall)
3-0-9 units. HASS-A

4.604 Formal Analysis in Architecture, Art, and Design
Subject meets with 4.603
Prereq: Permission of instructor
G (Fall)
Units arranged

Examines modern architecture, art, and design in the context of the political, economic, aesthetic, and cultural changes that occurred in the twentieth century. Presents foundational debates about social and technological aspects of modern architecture and the continuation of those debates into contemporary architecture. Incorporates varied techniques of historical and theoretical analysis to interpret exemplary objects, buildings, and cities of modernity. Additional work required of students taking the graduate version.

T. Hyde

4.605 A Global History of Architecture
Prereq: None
U (Spring)
4-0-8 units. HASS-A

Provides an outline of the history of architecture and urbanism from ancient times to the early modern period. Analyzes buildings as the products of culture and in relation to the special problems of architectural design. Stresses the geopolitical context of buildings and in the process familiarizes students with buildings, sites and cities from around the world.

M. Jarzombek

4.606 Visual Perception and Art
Prereq: None
U (Spring)
3-2-7 units. HASS-A; CI-H

Introduces visual perception from neurological, cultural, and artistic vantage points. Examines aspects of visual culture ranging from body adornment to public spaces, and from logotypes to moving images. Topics range from ritual space to forensics to machine-aided vision (cameras, radar devices, robotic scanners). Designed to develop skills in visual analysis and interpretation through lectures, oral presentations, field trips, and written essays.

C. Jones
4.607 Thinking About Architecture: In History and At Present
Prereq: 4.645 or permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Fall)
Units arranged

Studies the interrelationship of theory, history, and practice. Looks at theory not as specialized discourse relating only to architecture, but as touching on many issues, whether they be cultural, aesthetic, philosophical, or professional. Topics and examples are chosen from a wide range of materials, from classical antiquity to today.

D. Gissen

4.608 Seminar in the History of Art and Architecture
Subject meets with 4.609
Prereq: Permission of instructor
G (Spring)
Units arranged

Examination of historical method in art and/or architecture, focusing on periods and problems determined by the research interest of the faculty member leading the seminar. Emphasizes critical reading and viewing and direct tutorial guidance. Additional work required of students taking the graduate version.

HTC Staff

4.609 Seminar in the History of Art and Architecture
Subject meets with 4.608
Prereq: Permission of instructor
U (Spring)
3-0-9 units. HASS-A

Examination of historical method in art and/or architecture, focusing on periods and problems determined by the research interest of the faculty member leading the seminar. Emphasizes critical reading and viewing and direct tutorial guidance. Additional work required of students taking the graduate version.

HTC Staff

4.610 Civic Architecture in Islamic History
Subject meets with 4.611
Prereq: None
U (Fall)
3-0-9 units. HASS-A

4.611 Civic Architecture in Islamic History
Subject meets with 4.610
Prereq: None
G (Spring)
Units arranged

In-depth review of palatial, residential, governmental, military, commercial, and landscape architecture in the Islamic world from the 7th to the 21st century. Analysis the effects of politics, culture, religion and technology on the formation and development of Islamic architectural traditions, and their possible models and regional transformations. Additional work required of students taking the graduate version.

N. Rabbat

4.612 Islamic Architecture and the Environment
Prereq: Permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Fall)
3-0-6 units

Studies how Islamic architecture, landscape architecture, and urban planning reflect and transform environmental processes in various regions and climates of the Islamic world, from Andalusia to Southeast Asia, with an emphasis on South Asia, Central Asia, and the Middle East. Using systematic approaches to environmental data collection and analysis, examines strategies behind the design of selected architectural elements and landscape design types, ranging in scale from the fountain to the garden, courtyard, city, and agrarian region. Critically explores cultural interpretations of Islamic environmental design (e.g., paradise gardens), as they developed over time in ways that enrich, modify, or obscure their historical significance.

J. Wescoat

4.614 Architecture in the Islamic World
Prereq: None
U (Fall)
3-0-9 units. HASS-A

Introduces the history of Islamic cultures that spans fourteen centuries and three continents - Asia, Africa, Europe - and recent developments in the United States. Studies a number of representative examples, from the House of the Prophet to the present, in conjunction with their urban, social, political, and intellectual environments. Presents Islamic architecture both as a full-fledged historical tradition and as a dynamic and interactive cultural catalyst that influenced and was influenced by the civilizations with which it came in contact.

C. Hedrick
4.616 Selected Topics on Culture and Architecture
Prereq: Permission of instructor
G (Spring)
Units arranged
Seminar on how culture interacts with architecture. Analyzes architecture as a conveyor of messages that transcend stylistic, formal, and iconographic concerns to include an assessment of disciplinary, political, ideological, social, and cultural factors. Critically reviews methodologies and theoretical premises of studies on culture and meaning. Focuses on examples from Islamic history and establishes historical and theoretical frameworks for investigation.
N. Rabbat

4.617 Issues in Islamic Urbanism
Prereq: Permission of instructor
Acad Year 2016-2017: G (Spring)
Acad Year 2017-2018: Not offered
Units arranged
Seminar on selected topics from the history of Islamic urbanism. Examines patterns of settlement, urbanization, development, and architectural production in various places and periods, ranging from the formative period in the 7th century to the new cities emerging today. Discusses the leading factors in shaping and transforming urban forms, design imperatives, cultural and economic structures, and social and civic attitudes. Critically analyzes the body of literature on Islamic urbanism. Research paper required.
N. Rabbat

4.619 Historiography of Islamic Architecture
Prereq: Permission of instructor
Acad Year 2016-2017: G (Fall)
Acad Year 2017-2018: Not offered
3-0-9 units
Critical review of literature on Islamic art and architecture in the last two centuries. Analyzes the cultural, disciplinary, and theoretical contours of the field and highlights the major figures that have influenced its evolution. Challenges the tacit assumptions and biases of standard studies of Islamic art and architecture and addresses historiographic and critical questions concerning how knowledge of a field is defined, produced, and reproduced.
N. Rabbat

4.621 Orientalism and Representation
Prereq: Permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Fall)
Units arranged
Seminar on the historiography and politics of representation with special focus on Orientalist traditions in architecture, art, literature, and scholarship. Critically analyzes pivotal texts, projects, and images that informed the cross-cultural encounters between the West and the Orient from Antiquity to the present. Discusses how political and ideological attitudes and religious beliefs informed both the construction and reproduction of Western knowledge about the Islamic world as well as the revisionist Oriental self-representations. Research paper required.
S. Bozdogan

4.623 Islamic Gardens and Geographies
Prereq: Permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: G (Spring)
3-0-9 units
Seminar focuses on the historical geography of Islamic gardens, from Andalusia to Southeast Asia, with an emphasis on the Indian subcontinent. Critically engages evidence from archaeological, art historical, and cartographic sources, and explores strategies for generating integrative accounts of historical landscapes. Topics include gardens, cities, cultural landscapes, and political territories, along with their contemporary significance for cultural heritage conservation and design.
J. Wescoat

4.625[J] Water Planning, Policy, and Design
Same subject as 11.378[J]
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.
Focuses on water in environmental planning, policy, and design. Draws together faculty and students who are working on water-related research projects to develop and maintain a current perspective on the field from the site to metropolitan and international scales.
J. Wescoat
4.633 Locating Capitalism: Producing Early Modern Cities and Objects
Prereq: Permission of instructor
G (Spring)
Units arranged
Explores what defines the parameters of an early modern profit economy in Europe. Discusses major interpretive frameworks that historically have guided scholarship on the period in architectural, art, and economic history. Traces the core themes of commodification, production, and consumption - analyzing the relevance of studies on pre- and early modern globalization - to the culture and time under consideration. Can be taken for 9 or 12 units.
L. Jacobi

4.634 Early Modern Architecture and Art
Subject meets with 4.635
Prereq: None
G (Fall)
Units arranged

4.635 Early Modern Architecture and Art
Subject meets with 4.634
Prereq: None
U (Fall)
3-0-9 units. HASS-A
Presents a history, from the 14th through the early 17th century of architectural practice and design, as well as visual culture in Europe with an emphasis on Italy. Topics include the production and reception of buildings and artworks; the significance of a reinvigorated interest in antiquity; and representation of the individual, the state, and other institutions. Examines a variety of interpretive methods. Graduate students are expected to complete additional assignments.
L. Jacobi

4.640 Advanced Study in Critical Theory of Architecture
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.
Seminar on a selected topic in critical theory. Requires original research and presentation of oral and written report.
D. Gissen

4.641 19th-Century Art
Subject meets with 4.644
Prereq: None
U (Spring)
4-0-8 units. HASS-A

4.644 19th-Century Art
Subject meets with 4.641
Prereq: None
G (Spring)
Units arranged
Survey of visual culture from the late 18th century to 1900 with an emphasis on Western Europe and its global points of contact. Topics include art and revolution, empire and its image, mythologies of the artist, gender and representation, public exhibitions, the dealer/ critic system, and the emergence of the avant-garde. Strikes a balance between historical and contemporary critical perspectives to assess art’s engagement with social and political experience of modernity. Additional work required of students taking the graduate version.
K. Smentek

4.645 Selected Topics in Architecture: 1750 to the Present
Prereq: 4.210 or permission of instructor
G (Spring)
3-0-6 units
General study of modern architecture as a response to important technological, cultural, environmental, aesthetic, and theoretical challenges after the European Enlightenment. Focus on the theoretical, historiographic, and design approaches to architectural problems encountered in the age of industrial and post-industrial expansion across the globe, with specific attention to the dominance of European modernism in setting the agenda for the discourse of a global modernity at large. Explores modern architectural history through thematic exposition rather than as simple chronological succession of ideas.
A. Dutta

4.646 Research Programs in Modern Architecture
Prereq: 4.645 or permission of instructor
G (Spring)
Units arranged
Explores architectural positions developed in modern times, whether by individual architects or by groups of architects / researchers. Seminar offers a construction in the discipline of architecture parallel to the epistemology cast by Imre Lakatos, which sees science as a system of competing research programs. Participants explore and present notable positions within the discipline in modern times, mainly the 20th century.
T. Hyde
4.647 Technopolitics, Culture, Intervention  
Prereq: 4.645 or permission of instructor  
Acad Year 2016-2017: G (Fall)  
Acad Year 2017-2018: Not offered  
Units arranged  
Examines the manner in which key theories of technology have influenced architectural and art production in terms of their "humanizing" claims. Students test theories of technology on the grounds of whether technology is good or bad for humans.  
A. Dutta

Same subject as 21A.507[J]  
Subject meets with 4.649[J], 21A.519[J]  
Prereq: None  
Acad Year 2016-2017: U (Fall)  
Acad Year 2017-2018: Not offered  
3-0-9 units. HASS-A  
Examines the sonic phenomena and experiences that motivate scientific, humanistic, and artistic practices. Explores the aesthetic and technical aspects of how we hear; measure or describe vibrations; record, compress, and distribute resonating materials; and how we ascertain what we know about the world through sound. Although the focus is on sound as an aesthetic, social, and scientific object, the subject also investigates how resonance is used in the analysis of acoustics, architecture, and music theory. Students make a sonic artifact or research project as a final requirement. Students taking graduate version complete additional assignments.  
S. Helmreich, C. Jones

Same subject as 21A.519[J]  
Subject meets with 4.648[J], 21A.507[J]  
Prereq: None  
Acad Year 2016-2017: G (Fall)  
Acad Year 2017-2018: Not offered  
3-0-9 units  
Examines the sonic phenomena and experiences that motivate scientific, humanistic, and artistic practices. Explores the aesthetic and technical aspects of how we hear; measure or describe vibrations; record, compress, and distribute resonating materials; and how we ascertain what we know about the world through sound. Although the focus is on sound as an aesthetic, social, and scientific object, the subject also investigates how resonance is used in the analysis of acoustics, architecture, and music theory. Students make a sonic artifact or research project as a final requirement. Students taking graduate version complete additional assignments.  
S. Helmreich, C. Jones

4.651 Art Since 1940  
Prereq: None  
U (Spring)  
3-0-9 units. HASS-A  
Critical examination of major developments in European, Asian, and American art from 1940 to the present. Surveys the mainstream of art production but also examines marginal phenomena (feminism, identity politics, AIDS activism, net art) that come to change the terms of arts engagements with civic culture. Visits to area art museums and writing assignments develop skills for visual analysis and critical writing.  
C. Jones

4.652 Modern Art and Mass Culture  
Subject meets with 4.602  
Prereq: None  
Acad Year 2016-2017: G (Spring)  
Acad Year 2017-2018: Not offered  
Units arranged  
Introduction to theories of modernism and postmodernism and their related forms (roughly 18th century to present) in art and design. Focuses on how artists use the tension between fine art and mass culture to critique both. Examines visual art in a range of genres, from painting to design objects and "relational aesthetics." Works of art are viewed in their interaction with advertising, caricature, comics, graffiti, television, fashion, "primitive" art, propaganda, and networks on the internet. Additional work required of students taking the graduate version.  
C. Jones

4.661 Theory and Method in the Study of Architecture and Art  
Prereq: Permission of instructor  
G (Fall)  
3-0-9 units  
Can be repeated for credit.  
Studies theoretical and historiographical works pertaining to the fields of art and architectural history. Members of seminar pursue work designed to examine their own presuppositions and methods. Open only to PhD candidates and other advanced students.  
C. Jones

4.670 Nationalism, Internationalism, and Globalism in Modern Art  
Subject meets with 4.671  
Prereq: None  
Acad Year 2016-2017: Not offered  
Acad Year 2017-2018: G (Spring)  
Units arranged
4.671 Nationalism, Internationalism, and Globalism in Modern Art
Subject meets with 4.670
Prereq: 4.601 or permission of instructor
Acad Year 2016-2017: Not offered
Acad Year 2017-2018: U (Spring)
3-1-8 units
Studies how international modernism interacted with the concept of "nation" and how contemporary discourses concerning globalization changes that dynamic. Looks at how art uses and critiques globalization on various levels. Seminar attendance and visits to art museums required. Research paper required of students taking the graduate version.
C. Jones

4.672 Installation Art
Subject meets with 4.673
Prereq: None
Acad Year 2016-2017: G (Fall)
Acad Year 2017-2018: Not offered
Units arranged

4.673 Installation Art
Subject meets with 4.672
Prereq: 4.601 or permission of instructor
Acad Year 2016-2017: U (Fall)
Acad Year 2017-2018: Not offered
3-0-9 units
Focuses on a specific genre of contemporary art that produces environments or room-sized immersive forms rather than portable "art objects." Installation art is viewed from a historical perspective, as a rejection of the modernist aesthetic of purity and the neutral white gallery space. Its corollary in site-specific art is explored in relation to previous exhibition models such as natural history displays or merchandising conventions. Graduate students will be expected to produce a final research paper.
C. Jones

4.675 Collect, Classify, Consume
Prereq: Permission of instructor
G (Spring)
Units arranged
Can be repeated for credit.
Historical study of collecting from the Renaissance to the present. Addresses the practices of collecting and display at the both the individual and institutional level, and analyzes their social, aesthetic, scientific, political and economic dimensions. Specific themes vary from year to year. Offered for 9 or 12 units. May be repeated for credit with permission of instructor.
K. Smentek

4.677 Advanced Study in the History of Art
Prereq: Permission of instructor
G (Spring)
Units arranged
Can be repeated for credit.
Seminar in a selected topic in the history of art, with a particular emphasis on developments from the 18th century to the present. Oral presentations and research paper required. Offered for 9 or 12 units.
K. Smentek

4.686 SMArchS AKPIA Pre-Thesis Preparation
Prereq: 4.221; 4.619 or 4.621
G (Fall, Spring)
0-1-2 units
Preliminary study in preparation for the thesis for the SMArchS degree in the Aga Khan Program for Islamic Architecture. Topics include literature search, precedents examination, thesis structure and typologies, and short writing exercise.
N. Rabbat, J. Wescoat

4.687 SMArchS HTC Pre-Thesis Preparation
Prereq: 4.221, 4.661
G (Fall, Spring)
0-1-2 units
Preliminary study in preparation for the thesis for the SMArchS degree in History, Theory and Criticism. Topics include literature search, precedents examination, thesis structure and typologies, and short writing exercise.
HTC Staff

4.689 Preparation for History, Theory, and Criticism - Ph.D. Thesis
Prereq: Permission of instructor
G (Fall, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit.
HTC Staff
4.691 Independent Study in the History, Theory, and Criticism of Architecture and Art
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.
Supplementary work on individual or group basis. Registration subject to prior arrangement for subject matter and supervision by staff.
HTC Staff

4.692 Independent Study in the History, Theory, and Criticism of Architecture and Art
Prereq: Permission of instructor
U (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.
Supplementary work on individual or group basis. Registration subject to prior arrangement for subject matter and supervision by staff.
HTC Staff

4.693 Independent Study in the History, Theory, and Criticism of Architecture and Art
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged
Can be repeated for credit.
Supplementary work on individual basis. Registration subject to prior arrangement for subject matter and supervision by staff.
HTC Staff

4.694 Independent Study in the History, Theory, and Criticism of Architecture and Art
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Units arranged [P/D/F]
Can be repeated for credit.
Supplementary work on individual basis. Registration subject to prior arrangement for subject matter and supervision by staff.
HTC Staff

4.560 Special Subject: History, Theory and Criticism of Architecture and Art
Prereq: None
U (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.
Seminar or lecture on a topic in the history, theory and criticism of architecture and art that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
HTC Staff

4.561 Special Subject: History, Theory and Criticism of Architecture and Art
Prereq: None
U (IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.
Seminar or lecture on a topic in the history, theory and criticism of architecture and art that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
HTC Staff

4.562 Special Subject: History, Theory and Criticism of Architecture and Art
Prereq: Permission of instructor
G (Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.
Seminar or lecture on a topic in the history, theory and criticism of architecture and art that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
HTC Staff
4.S63 Special Subject: History, Theory and Criticism of Architecture and Art
Prereq: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in the history, theory and criticism of architecture and art that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
_F. Scott_

4.S64 Special Subject: History, Theory and Criticism of Architecture and Art
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Seminar or lecture on a topic in the history, theory and criticism of architecture and art that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
_HTC Staff_

4.S65 Special Subject: Advanced Study in Islamic Architecture
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in Islamic or non-western architecture that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports, varying at the discretion of the instructor.
_HTC Staff_

4.S66 Special Subject: History, Theory and Criticism of Art
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in the history, theory and criticism of art that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
_K. Smentek_

4.S67 Special Subject: Study in Modern Art
Prereq: Permission of instructor
G (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in the history, theory and criticism of modern art that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
_HTC Staff_

4.S68 Special Subject: Study in Modern Architecture
Prereq: Permission of instructor
G (Spring)
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in the history, theory and criticism of modern architecture that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
_T. Hyde_

4.S69 Special Subject: Advanced Study in the History of Urban Form
Prereq: Permission of instructor
G (IAP, Spring)
Not offered regularly; consult department
Units arranged
Can be repeated for credit.

Seminar or lecture on a topic in the history, theory and criticism of urban form that is not covered in the regular curriculum. Requires original research and presentation of oral and written reports and/or design projects, varying at the discretion of the instructor.
_HTC Staff_
Thesis and UROP

Graduate Subjects

4.THG Graduate Thesis
Prereq: Permission of instructor
G (Fall, IAP, Spring, Summer)
Units arranged
Can be repeated for credit.

Program of research and writing of thesis; to be arranged by the student with supervising committee.

Staff

Undergraduate Subjects

4.119 Preparation for Undergraduate Architecture Design Thesis
Prereq: 4.024
U (Fall)
1-0-2 units

Selection of thesis topic, defining method of approach, and preparation of thesis proposal for BSA degree in architecture.
Weekly class meeting as well as individual conference with faculty.

L. Bello

Same subject as 11.THT[J]
Prereq: None
U (Fall)
3-0-9 units
Can be repeated for credit.

See description under subject 11.THT[J].

C. Abbanat

4.THU Undergraduate Thesis
Prereq: 4.THT[J] or 4.119
U (Fall, IAP, Spring, Summer)
Units arranged
Can be repeated for credit.

Program of thesis research leading to the writing of an SB thesis, to be arranged by the student and an appropriate MIT faculty member.
Intended for seniors. 12 units recommended.

Architecture Staff

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

Research and project activities, which cover the range represented by the various research interests and projects in the department.
Students who wish a letter grade option for their work must register for 4.URG.

L. Sass