ARCHITECTURE (ARCH)

Courses primarily for undergraduates:

ARCH 2010: Architectural Design I
Credits: 6. Contact Hours: Lecture 1, Studio 15.
Prereq: Admission into the Professional program in Architecture
Introduction to architectural design including design process, drawing conventions, methods of design analysis, and model making using both analog and digital tools. Studio projects focus on formal and volumetric principles of pattern and composition, investigations of site conditions, and understanding of scale. Field trips to relevant architectural sites. (Typically Offered: Fall)

ARCH 2010H: Architectural Design I: Honors
Credits: 6-7. Contact Hours: Studio 13.5, Lecture 1.5.
Prereq: Admission into the Professional program in Architecture
Introduction to architectural design including design process, drawing conventions, methods of design analysis, and model making using both analog and digital tools. Studio projects focus on formal and volumetric principles of pattern and composition, investigations of site conditions, and understanding of scale. Field trips to relevant architectural sites. (Typically Offered: Fall)

ARCH 2020: Architectural Design II
Credits: 6. Contact Hours: Lecture 1.5, Studio 13.5.
Prereq: ARCH 2010*;* MATH 1450*;* PHYS 1310*;* PHYS 2310L
Continuation of fundamental architectural design exploration. Studio projects focus on the generation of ideas based on experience and systematic analysis of tectonics. Emphasis on design development through detail, materiality, and spatial relationships. Students work in groups and individually. Representational methods expand on architectural conventions through experimentation. Field trips to relevant architectural sites. (Typically Offered: Spring)

ARCH 2020H: Architectural Design II, Honors
Credits: 6-7.
Prereq: ARCH 2010*;* MATH 1450*;* PHYS 1310*;* PHYS 2310L
Continuation of fundamental architectural design exploration. Studio projects focus on the generation of ideas based on experience and systematic analysis of tectonics. Emphasis on design development through detail, materiality, and spatial relationships. Students work in groups and individually. Representational methods expand on architectural conventions through experimentation. Field trips to relevant architectural sites. (Typically Offered: Spring)

ARCH 2200: Contemporary Architecture
Credits: 3. Contact Hours: Lecture 3.
Survey of global architectural ideas and practices from 1990 to the present. Emphasis will be given to recent movements and architectural manifestations, as well as close examinations of socio-cultural conditions for contemporary practice. (Typically Offered: Fall)

ARCH 2210: Histories and Theories of Architecture to 1750
Credits: 3. Contact Hours: Lecture 3.
Survey of architectural ideas, theories, and practices before 1750. Emphasis on the mutually formative relationship between architecture and the social, cultural, economic, and political forces, nationally and globally, in which it is produced. Meets International Perspectives Requirement. (Typically Offered: Fall)

ARCH 2300: Design Communications I
Credits: 3. Contact Hours: Lecture 2, Studio 2.
Prereq: Admission into the Professional program in Architecture
Investigations of various design media and their applications to design. Exercises to develop representational skills and perceptual sensitivity. (Typically Offered: Fall)

ARCH 2310: Advanced Design Representation
Credits: 3. Contact Hours: Lecture 3.
Prereq: ARCH 2300*; Junior, Senior or graduate standing*
Advanced investigations of various design media and their applications to design. Emphasis on careful consideration of media, mixed-media strategies and development of craft. Offered irregularly. (Typically Offered: Fall)

ARCH 3010: Architectural Design III
Credits: 6. Contact Hours: Lecture 1, Studio 15.
Prereq: ARCH 2020
Consideration of landscape as a constructed, cultural artifact. Projects address the perceptual aspects and strategies of situation and location; examination of environmental phenomena and patterns of use and settlement as revealed and affected by the architectural artifact. Development of a critical design process is stressed. (Typically Offered: Fall)

ARCH 3010H: Architectural Design III: Honors
Credits: 6-7. Contact Hours: Studio 15, Lecture 1.
Prereq: ARCH 2020
Consideration of landscape as a constructed, cultural artifact. Projects address the perceptual aspects and strategies of situation and location; examination of environmental phenomena and patterns of use and settlement as revealed and affected by the architectural artifact. Development of a critical design process is stressed. (Typically Offered: Fall)

ARCH 3020: Architectural Design IV
Credits: 6. Contact Hours: Lecture 1.5, Studio 13.5.
Prereq: Minimum grade of C in ARCH 3010
Design for housing in an urban context that demonstrates a synthetic understanding of diverse scales of use and occupation as shaped by user requirements, site conditions, and principles for inclusive design. Consideration of regulatory requirements and measurable environmental impacts of the proposal on its site. (Typically Offered: Spring)

ARCH 3020H: Architectural Design IV: Honors
Credits: 6-7.
Prereq: Minimum grade of C in ARCH 3010
Design for housing in an urban context that demonstrates a synthetic understanding of diverse scales of use and occupation as shaped by user requirements, site conditions, and principles for inclusive design. Consideration of regulatory requirements and measurable environmental impacts of the proposal on its site. (Typically Offered: Spring)

ARCH 3210: History of the American City
Credits: 3. Contact Hours: Lecture 3.
Prereq: Sophomore classification
Study of the development of the built environment and urban condition in the United States from the colonial period to today. Primary attention is given to urban spatial organization, built form, technological change, regulatory and funding patterns, and social categories such as class, race, and gender. Credit counts toward fulfillment of History, Theory, Culture requirements. Meets U.S. Diversity Requirement.

ARCH 3220: Histories and Theories of Architecture after 1750
Credits: 3. Contact Hours: Lecture 3.
Prereq: Sophomore classification
Survey of architectural ideas, theories and practices from 1750 to 1990. Emphasis on the mutually formative relationship between architecture and the social, cultural, economic, and political forces, nationally and globally, in which it is produced. Meets International Perspectives Requirement. (Typically Offered: Spring)

ARCH 3340: Computer-aided Architectural Design
Credits: 3. Contact Hours: Lecture 2, Studio 2.
Exploration of current and potential applications of computing in architectural design. Projects engage digital design methods, data and media workflows.

ARCH 3350: Three-Dimensional Studio
Credits: 3. Repeatable, maximum of 6 credits.
This course deals with three dimensional problems in visual invention, organization, and expression emphasizing creative manipulation of tools, materials, and techniques as means for three-dimensional thinking. Projects cover the additive (modeling), subtractive (carving), substitutional (casting) as well as constructive techniques.

ARCH 3450: Building Science and Technology I
Credits: 2. Contact Hours: Lecture 2.
Prereq: Undergraduate: Admission to the professional program in architecture; concurrent enrollment in ARCH 3450L*; graduate: Admission to the M. Arch. program and concurrent enrollment in* ARCH 5050 *and* ARCH 5950*; concurrent enrollment in ARCH 5450L*
First course in a sequence focused on architectural building technologies. Lectures and labs cover: environmental forces and systems (solar orientation, climate, daylighting, natural ventilation, human comfort and occupancy patterns), materials and assemblies (drawing conventions, building codes, and physical properties of materials) and fundamental structural principles (forces/loads, equilibrium, and stability) to understand impact of the built environment on human health, safety, and welfare at building scales. (Typically Offered: Fall)

ARCH 3450L: Building Science and Technology I Lab
Credits: 1. Contact Hours: Laboratory 2.
Prereq: Admission to the professional program in architecture; concurrent enrollment in ARCH 3450*.*
Laboratory to accompany ARCH 3450 and must be taken concurrently. Integrating building technologies into architectural designs through experiments and exercises in laboratory format. (Typically Offered: Fall)

ARCH 3460: Building Science and Technology II
Credits: 3. Contact Hours: Lecture 3.
Prereq: ARCH 3450*,* ARCH 3450L*,* MATH 1450*, and* PHYS 1310 *and* PHYS 1310L*; concurrent enrollment in* ARCH 3460L
Second course in a sequence focused on architectural building technologies. Lectures and labs cover: environmental systems (heat transfer in the building envelope, passive heating and cooling, daylighting, thermal comfort, analytical guidelines and building energy calculation methods), materials & assemblies (building envelope systems, accessibility, egress, and material properties), and structural systems (structural system selection/comparison, and design and analysis of 'form-active' compression and tension structures) to understand impact of the built environment on human health, safety, and welfare at building scales. (Typically Offered: Spring)

ARCH 3460L: Building Science and Technology II Lab
Credits: 2. Contact Hours: Laboratory 4.
Prereq: ARCH 3450*,* ARCH 3450L*,* MATH 1450*, and* PHYS 1310 *and* PHYS 1310L*; concurrent enrollment in* ARCH 3460L
Laboratory to accompany ARCH 3460 and must be taken concurrently. Integrating building technologies into architectural designs through experiments and exercises in laboratory format. (Typically Offered: Spring)

ARCH 3470: Building Science and Technology III
Credits: 3. Contact Hours: Lecture 3.
Prereq: ARCH 3460, ARCH 3460L*; concurrent enrollment in* ARCH 3470L
Third course in a sequence focused on architectural building technologies. Lectures and labs cover: multistory building framing, assembly, and enclosure systems, sizing and selecting structural framing components (foundations, columns, beams, etc.), and an environmental design process that demonstrates the ability to integrate climate into the control of thermal, luminous, ventilative and acoustic environments. Introduction to plumbing and rain water collection systems to understand the impact of the built environment on human health, safety, and welfare at building scales and to assess those technologies against performance objectives of projects. (Typically Offered: Fall)

ARCH 3470L: Building Science and Technology III Lab
Credits: 2. Contact Hours: Laboratory 4.
Prereq: ARCH 3460, ARCH 3460L*; concurrent enrollment in* ARCH 3470
Laboratory to accompany ARCH 3470 and must be taken concurrently. Integrating building technologies into architectural designs through experiments and exercises in laboratory format.

ARCH 3480: Building Science and Technology IV
Credits: 3. Contact Hours: Lecture 3.
Prereq: ARCH 3470, ARCH 3470L*; concurrent enrollment in* ARCH 3480L
Fourth course in a sequence focused on architectural building technologies. Lectures and labs cover: ability to demonstrate active environmental HVAC control systems design, use and design of mechanical, electrical, plumbing, fire safety, transportation, and conveying systems and subsystems, constructed building assemblies and details (building envelope details for waterproofing and enclosure, advanced material properties, costs, and serviceability), and structural design for multi-story structures (design and documenting various framing patterns, integration with other building systems, and lateral stability strategies for wind and seismic) to understand the impact of the built environment on human health, safety, and welfare at building scales and to assess those technologies against performance objectives of projects. (Typically Offered: Spring)

ARCH 3480L: Building Science and Technology IV Lab
Credits: 2. Contact Hours: Laboratory 4.
Prereq: ARCH 3470, ARCH 3470L*; concurrent enrollment in* ARCH 3480
Laboratory to accompany ARCH 3480 and must be taken concurrently. Integrating building technologies into architectural designs through experiments and exercises in laboratory format. (Typically Offered: Spring)

ARCH 3710: Human Behavior and Environmental Theory
Credits: 3. Contact Hours: Lecture 3.
Prereq: Admission into the Professional program in Architecture
Exploration of theories that describe social structure and order and the manner in which individuals and societies organize themselves and structure their environment.

ARCH 4010: Architectural Design V
Credits: 6.
Prereq: Minimum grade of C in ARCH 3020
Projects showing students' ability to integrate knowledge of sound building design into a comprehensive architectural proposal that reflects sustainable design principles. Consideration of site, structure, building envelope, environmental controls, life safety, and methods to measure building performance. Projects typically are closely connected to the physical, environmental, and social context of their sites. (Typically Offered: Fall)

ARCH 4010H: Architectural Design V: Honors
Credits: 6-7.
Prereq: Minimum grade of C in ARCH 3020
Projects showing students' ability to integrate knowledge of sound building design into a comprehensive architectural proposal that reflects sustainable design principles. Consideration of site, structure, building envelope, environmental controls, life safety, and methods to measure building performance. Projects typically are closely connected to the physical, environmental, and social context of their sites. (Typically Offered: Fall)

ARCH 4020: Architectural Design VI
Credits: 6. Contact Hours: Lecture 1, Studio 15.
Prereq: Minimum grade of C in ARCH 4010
An examination of the relationship between architecture and the city. Studio projects stress analysis and interpretation of the diverse forces and conditions that impact and inform architecture in the urban environment. Urban design project. Study abroad option. (Typically Offered: Spring)

ARCH 4020H: Architectural Design VI: Honors
Credits: 6-7.
Prereq: Minimum grade of C in ARCH 4010
An examination of the relationship between architecture and the city. Studio projects stress analysis and interpretation of the diverse forces and conditions that impact and inform architecture in the urban environment. Urban design project. Study abroad option. (Typically Offered: Spring)

ARCH 4030: Architectural Design VII
Credits: 6.
Prereq: ARCH 4020
Advanced studio as incubator for examining progressive agendas within or beyond the discipline of architecture. Innovative research that is academically rigorous, critically informed, speculative, and design-led is encouraged. Projects and creative outputs vary per studio instructor. (Typically Offered: Fall)

ARCH 4030H: Architectural Design VII: Honors
Credits: 6-7.
Prereq: ARCH 4020
Advanced studio as incubator for examining progressive agendas within or beyond the discipline of architecture. Innovative research that is academically rigorous, critically informed, speculative, and design-led is encouraged. Projects and creative outputs vary per studio instructor. (Typically Offered: Fall)

ARCH 4040: Architectural Design VIII
Credits: 6. Contact Hours: Lecture 1.5, Studio 13.5.
Prereq: ARCH 4030
Advanced forum for architectural research and/or design. Choice of thematic studios or student initiated research and design. Experimentation and innovation are encouraged. DSNS 4460 or DSNS 5460, for 6 cr. each time taken, can be substituted for this class and be taken up to a maximum of 12 credits. (Typically Offered: Spring)

ARCH 4040H: Architectural Design VIII: Honors
Credits: 6-7.
Prereq: ARCH 4030
Advanced forum for architectural research and/or design. Choice of thematic studios or student initiated research and design. Experimentation and innovation are encouraged. DSNS 4460 or DSNS 5460, for 6 cr. each time taken, can be substituted for this class and be taken up to a maximum of 12 credits. (Typically Offered: Spring)

ARCH 4170: Big and Tall: A History of Construction
(Dual-listed with ARCH 5170).
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: Junior or Senior Classification
History, theory, and principles of construction from ancient times through today. Analytic project or term paper and weekly readings with discussion questions. Credit counts toward fulfillment of History, Theory, Culture requirements.

ARCH 4200: Topics in American Architecture
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: Junior classification
History, theory, and principles of American architecture and urban design considering relationships to the culture, visual arts, site, and surroundings. Credit counts toward fulfillment of History, Theory, Culture requirements. Graduation Restriction: A maximum of 6 credits of ARCH 4200 may be applied to degree program.

ARCH 4220: Topics in Medieval Architecture
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: Junior classification
History, theory, and principles of American architecture and urban design considering relationships to the culture, visual arts, site, and surroundings. Credit counts toward fulfillment of History, Theory, Culture requirements. Graduation Restriction: A maximum of 6 credits of ARCH 4200 may be applied to degree program. Meets International Perspectives Requirement.

ARCH 4230: Topics in Renaissance to Mid-Eighteenth Century Architecture
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: Junior classification
History, theory, and principles of renaissance to mid-eighteenth century architecture and urban design considering relationships to the culture, visual arts, site, and surroundings. Credit counts toward fulfillment of History, Theory, Culture requirements. Meets International Perspectives Requirement.

ARCH 4240: Topics in Nineteenth Century Architecture
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: Junior classification
History, theory, and principles of nineteenth century architecture and urban design considering relationships to the culture, visual arts, site, and surroundings. Credit counts toward fulfillment History, Theory, Culture requirements. Graduation Restriction: A maximum of 6 credits of ARCH 4240 may be applied to degree program.

ARCH 4250: Topics in Twentieth Century and Contemporary Architecture
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: Junior classification
History, theory, and principles of twentieth century architecture and urban design considering relationships to the culture, visual arts, site, and surroundings. Credit counts toward fulfillment History, Theory, Culture requirements. Graduation Restriction: A maximum of 6 credits of ARCH 4250 may be applied to degree program.

ARCH 4260: Topics in Native American Architecture
(Cross-listed with AMIN 4260).
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: Junior classification
History, theory, and principles of Native American/American Indian architecture, landscape architecture and planning considering relationships to the culture, visual arts, site, and surroundings. Credit counts toward fulfillment History, Theory, Culture. Graduation Restriction: A maximum of 6 credits of ARCH 4260 may be applied to degree program.

ARCH 4270: History, Theory, and Criticism of Chinese Architecture
(Dual-listed with ARCH 5270).
Credits: 3. Contact Hours: Lecture 3.
Prereq: Senior classification
The history and theoretical concept of Chinese built environment with emphasis on the morphology of built form and its relationship to art, landscape design, and urban structure. Credit counts toward fulfillment History, Theory, Culture. Meets International Perspectives Requirement. (Typically Offered: Fall)

ARCH 4290: Topics in Italian Architecture
Credits: 3. Contact Hours: Lecture 3.
Prereq: Junior classification
History, theory and principles of Italian architecture considering relationships to the culture, visual arts, site, and surroundings. Credit counts toward fulfillment of History, Theory, Culture requirements. (Typically Offered: Spring)

ARCH 4310: Analytical Drawing
Credits: 3. Contact Hours: Lecture 1, Studio 6.
Repeatable, maximum of 12 credits.
Exploration of 2- and 3-dimensional representations. Emphasis on on-site freehand sketching, perspective and orthographic drawing, rendering of shadows and textures, and use of diverse media. (Typically Offered: Fall, Spring)

ARCH 4320: Advanced Computer Lighting and Rendering
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Exploration of the computer as a design and communication tool. Emphasis on lighting and rendering techniques.

ARCH 4330: Digital Fabrication
(Dual-listed with ARCH 5330).
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: ARCH 2310 *and* ARCH 3010
Exploration of the computer as a design and manufacturing tool. Emphasis on developing digital fabrication technologies and workflows. (Typically Offered: Fall, Spring)

ARCH 4340: Advanced Computer-aided Architectural Design
Credits: 3. Contact Hours: Lecture 1, Studio 4.
Specialized investigations of the computer as a design tool. Development of computer software and workflows for architectural and environmental problem solving.

ARCH 4360: Advanced Design Media
(Dual-listed with ARCH 5360).
Credits: 3. Repeatable, maximum of 6 credits.
Special topics in design media applications. (Typically Offered: Fall, Spring)

ARCH 4370: Architectural Photography
Credits: 3. Contact Hours: Lecture 3.
Emphasis on use of the camera and lighting in photographing drawings and interior and exterior building environments.

ARCH 4380: Architectural Robotics
(Dual-listed with ARCH 5380).
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Prereq: ARCH 2310*; ARCH 3010; or instructor permission. Junior, senior, or graduate standing*
Exploration of robots as design and manufacturing tools for architects. Emphasis on developing robotic technologies and workflows with relevance to architectural design.

ARCH 4390: Computational Design Theory
(Dual-listed with ARCH 5390).
Credits: 3. Contact Hours: Lecture 3.
Prereq: ARCH 2200*,* ARCH 2210*, and* ARCH 3220 *or senior classification or graduate standing.*
Seminar discussion of critical readings and theories surrounding computational design; This course surveys the history and development of digital computing and its use in design from early thought experiments, to computer-aided design systems, to present day artificial intelligences and robotics. The potentials and consequences of emerging computational design systems are discussed.

ARCH 4450: Building Science and Technology V
Credits: 2. Contact Hours: Lecture 2.
Prereq: ARCH 3480*,* ARCH 3480L*; concurrent enrollment in* ARCH 4450L
Final course in a sequence of architectural building technology courses comprising environmental systems, materials/assembly, and building structures topics. Using both lectures and labs, the three interrelated modules each emphasize a particular building technology subject with an overall focus on synthesizing and integrating building technologies together in sustainable design strategies. Topics include: integration of active environmental control and service systems into the design of larger scale buildings, the development of construction details for building shell and interiors, and the design and analysis of various long-span structural systems. Environmental modeling and simulation to develop the ability to integrate measurable outcomes of building performance. (Typically Offered: Fall)

ARCH 4450L: Building Science and Technology V Lab
Credits: 1. Contact Hours: Laboratory 2.
Prereq: Concurrent enrollment in ARCH 4450
Laboratory to accompany ARCH 4450 and must be taken concurrently. Integrating building technologies into architectural designs through experiments and exercises in laboratory format. (Typically Offered: Fall)

ARCH 4510: Whole Building Energy Performance Modeling
(Dual-listed with ARCH 5510).
Credits: 3. Contact Hours: Lecture 2, Studio 2.
Prereq: ARCH 2020*;* ARCH 3460*;* ARCH 3460L*; or permission of instructor*
Architectural design, design evaluation and technical analysis using energy, daylighting, and natural ventilation performance modeling tools. Emphasis will be given to whole building energy efficiency including passive and active systems integration. (Typically Offered: Spring)

ARCH 4820: Professional Practice
(Dual-listed with ARCH 5820).
Credits: 3. Contact Hours: Lecture 3.
Prereq: Junior classification and ARCH 3710
Emphasis on the circumstances and opportunities of the professional practice of architecture: practice as profession, process, organization, business, and evolving models of practice. (Typically Offered: Fall)

ARCH 4860: Urban Design Explorations
Credits: 3. Contact Hours: Lecture 3.
An investigation of urban design realities in its contemporary form as part of International study abroad program in Rome. Credit counts toward fulfillment of History, Theory, Culture requirements. (Typically Offered: Spring)

ARCH 4900A: Independent Study: Design Communications.
Credits: 1-9. Repeatable.
Prereq: Instructor Permission for Course
Independent investigation.

ARCH 4900B: Independent Study: Design
Credits: 1-9. Repeatable.
Prereq: Instructor Permission for Course
Independent investigation.

ARCH 4900C: Independent Study: Building Science and Technology
Credits: 1-9. Repeatable.
Prereq: Instructor Permission for Course
Independent investigation.

ARCH 4900D: Independent Study: Architectural History
Credits: 1-9. Repeatable.
Prereq: Instructor Permission for Course
Independent investigation.

ARCH 4900E: Independent Study: Behavioral Studies
Credits: 1-9. Repeatable.
Prereq: Instructor Permission for Course
Independent investigation.

ARCH 4900F: Independent Study: Practice
Credits: 1-9. Repeatable.
Prereq: Instructor Permission for Course
Independent investigation.

ARCH 4900H: Independent Study: Honors
Credits: 1-9. Repeatable, maximum of 9 times.
Prereq: Instructor Permission for Course
Independent investigation.

Courses primarily for graduate students, open to qualified undergraduates:

ARCH 5050: Architectural Design and Media I: Mapping, Programming, Building
Credits: 6. Contact Hours: Studio 12.
An introduction to comprehensive architectural design projects that focuses on three interrelated design skills: mapping, programming and building. Projects establish a framework for designing buildings that considers multiple factors such as environmental forces, construction methods, building codes, urban regulations, social relationships, and cultural values. (Typically Offered: Fall)

ARCH 5060: Architectural Design and Media II: Materiality and Representation
Credits: 6. Contact Hours: Studio 12.
Small-scale architectural design projects that investigate design representation through analogue and digital means. The projects explore different representation strategies to help students develop an understanding of the particular modes of architectural representation that advance the designer's knowledge of space as a complex interaction between materials with inherent physical characteristics, mobile socializing bodies, and changing environmental cycles. (Typically Offered: Spring)

ARCH 5070: Architectural Design and Media III: Design in Detail
Credits: 5. Contact Hours: Studio 10.
Design projects that emphasize the multi-faceted role of the architectural detail in the design process through first, understanding the historical specificity of building construction and detailing; second, utilizing working drawing as a mode of communication; and third, designing with details. (Typically Offered: Summer)

ARCH 5160: Exhibiting Architecture
Credits: 3. Contact Hours: Lecture 3.
History and theory of architectural exhibitions from the 19th century until today. Weekly readings with in-class discussions and a small curatorial project. Credit counts toward fulfillment of History, Theory, Culture requirements.

ARCH 5170: Big and Tall: A History of Construction
(Dual-listed with ARCH 4170).
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
History, theory, and principles of construction from ancient times through today. Analytic project or term paper and weekly readings with discussion questions. Credit counts toward fulfillment of History, Theory, Culture requirements.

ARCH 5180: Balkans to Baltics: Architecture and Innovation in Europe's Middle
Credits: 3. Contact Hours: Lecture 3.
History and theory of 20th century architecture in East- Central Europe. Analytic project or term paper and weekly readings with in-class discussion. Credit counts toward fulfillment of History, Theory, Culture requirements. Meets International Perspectives Requirement.

ARCH 5210: Celluloid Cities, Urbanism in Film
Credits: 3. Contact Hours: Lecture 3.
Urban theory and history as manifested in popular films and videos, both fiction and documentary. Term projects require students to make short videos. (Experience with video-making not necessary.) Credits counts towards fulfillment of History, Theory, Culture requirement.

ARCH 5220: Complex Adaptive Systems Theory for the Design of Built Environments
Credits: 3. Contact Hours: Lecture 3.
The principles of complex adaptive systems theory are studied and then applied towards the design of resilient and responsive built environments. Topics cover a broad spectrum, including urban informalities, tactical approaches, the capacity of digital infrastructures to coordinate distributed human practices, and emergent phenomena. Credit counts toward fulfillment of History, Theory, Culture requirements.

ARCH 5250: Meaning and Form in Architecture
Credits: 3. Contact Hours: Lecture 3.
Seminar on critical analysis of meaning and form in architecture and human-made environment in various cultural contexts examined from historical and theoretical perspectives. Analytic term paper and weekly readings with discussion questions. Credit counts toward fulfillment of History, Theory, Culture requirements. Meets International Perspectives Requirement.

ARCH 5270: History, Theory, and Criticism of Chinese Architecture
(Dual-listed with ARCH 4270).
Credits: 3. Contact Hours: Lecture 3.
The history and theoretical concept of Chinese built environment with emphasis on the morphology of built form and its relationship to art, landscape design, and urban structure. Credit counts toward fulfillment History, Theory, Culture. Meets International Perspectives Requirement. (Typically Offered: Fall)

ARCH 5280A: Studies in Architecture: Culture
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 times.
Prereq: ARCH 2200*,* ARCH 2210*, and* ARCH 3220 *or senior classification or graduate standing.*
Topical offerings change by semester. Credit counts toward fulfillment of History, Theory, Culture requirements.

ARCH 5280B: Studies in Architecture: Technology
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 times.
Studies in Architecture: Technology.

ARCH 5280C: Studies in Architecture: Communications
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 times.
Studies in Architecture: Communications.

ARCH 5280E: Studies in Architecture: Practice
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 times.
Studies in Architecture: Practice.

ARCH 5300: Formworks
Credits: 3. Contact Hours: Lecture 3.
Studies and activities showing fabrication as a means of speculation and discourse about materiality. Focus is given to the concepts and values embedded in materials and how we build at various scales. (Typically Offered: Fall, Spring)

ARCH 5310: Drawing Culture
Credits: 3. Contact Hours: Lecture 3.
Exploration of theories and practices that center on drawing as a fundamental means of knowing.

ARCH 5330: Digital Fabrication
(Dual-listed with ARCH 4330).
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Exploration of the computer as a design and manufacturing tool. Emphasis on developing digital fabrication technologies and workflows. (Typically Offered: Fall, Spring)

ARCH 5340: Topics in Computer-aided Architectural Design
Credits: 3. Repeatable, maximum of 6 credits.
Emphasis on advanced, exploratory approaches to design computing. Projects highlight experimentation and integration of multiple media types. (Typically Offered: Fall)

ARCH 5350: Advanced Three-Dimensional Studio
Credits: 3. Repeatable, maximum of 6 credits.
Advanced investigation of sculptural expression with emphasis on individual projects.

ARCH 5360: Advanced Design Media
(Dual-listed with ARCH 4360).
Credits: 3. Repeatable, maximum of 6 credits.
Special topics in design media applications. (Typically Offered: Fall, Spring)

ARCH 5380: Architectural Robotics
(Dual-listed with ARCH 4380).
Credits: 3. Contact Hours: Lecture 3.
Repeatable, maximum of 6 credits.
Exploration of robots as design and manufacturing tools for architects. Emphasis on developing robotic technologies and workflows with relevance to architectural design.

ARCH 5390: Computational Design Theory
Credits: 0-99. Contact Hours: Lecture 3.
What is the role of the human designer when automation, simulation, and other computationally-driven processes enter into the picture? This seminar approaches such questions from the perspective of architecture and design, supplemented with multidisciplinary readings from mathematics, cognitive science, computer science, evolutionary biology, and philosophy. Students will cultivate a sense of what is possible with new technologies, and to begin to articulate a position -- a theory or theories -- of how humans and computers will design together in the future. Participation required in class discussions and constructive debates. Final project is a research paper.

ARCH 5400: Regimes of Perception
Credits: 3. Contact Hours: Lecture 3.
Exploration of theories, methodologies, and apparatuses of projection as a spatial and material practice. Readings and discussions accompany assignments for projection through drawing, fabrication, and performance. (Typically Offered: Fall, Spring)

ARCH 5430: Building Science and Technology I
Credits: 6.
Introduction to analytical, experimental, and computational methods to understand the impacts of building physics and mechanics of the built environment on human health, safety, and welfare at building scales. Lectures and labs cover environmental forces and systems, materials & assemblies, fundamental structural principles, and digital modeling.

ARCH 5440: Building Science and Technology II
Credits: 3. Contact Hours: Lecture 2, Studio 2.
Extension to the understanding of fundamental building technologies and their impacts. Lectures and labs cover building assemblies, enclosure systems, structural framing components, water management, and measurable indoor environment, to further understand the impact of the built environment on human health, safety, and welfare.

ARCH 5510: Whole Building Energy Performance Modeling
(Dual-listed with ARCH 4510).
Credits: 3. Contact Hours: Lecture 2, Studio 2.
Architectural design, design evaluation and technical analysis using energy, daylighting, and natural ventilation performance modeling tools. Emphasis will be given to whole building energy efficiency including passive and active systems integration. (Typically Offered: Spring)

ARCH 5580: Sustainability and Green Architecture
Credits: 3. Contact Hours: Lecture 3.
Issues of sustainability as related to living patterns and city design, population, pollution and use and availability of natural resources for the built environment. Issues of green and sustainable architecture as related to critical thinking about methods of building material selection and systems, the environment of the United States and the world, and examples of green or sustainable building designs.

ARCH 5670: Preservation, Restoration, Rehabilitation, Cultural Heritage, and Technology
Credits: 3. Contact Hours: Lecture 3.
Standards and procedures-including the use of current digital technologies-for preserving, restoring, reconstructing, and rehabilitating existing buildings following the guidelines of the National Park Service and the National Trust for Historic Preservation. Credit counts toward fulfillment of History, Theory, Culture requirements.

ARCH 5680: Historic Preservation
Credits: 3. Contact Hours: Lecture 3.
The history and theory of the Historic Preservation movement including an overview of the National Trust for Historic Preservation; the National Register of the Historic Places; the National Park Service; federal programs, funding sources, preservation law, national landmarks, and historic distracts. Credit counts toward fulfillment of History, Theory, Culture requirements. (Typically Offered: Fall)

ARCH 5710: Design for All People
(Cross-listed with GERON 5710).
Credits: 3. Contact Hours: Lecture 3.
Principles and procedures of inclusive design in response to the varying ability level of users. Assessment and analysis of existing buildings and sites with respect to standards and details of accessibility for all people, including visually impaired, mentally impaired, and mobility restricted users. Design is neither a prerequisite nor a required part of the course. Enrollment open to students majoring in related disciplines. Credit counts toward fulfillment of History, Theory, Culture requirements. (Typically Offered: Spring)

ARCH 5750: Contemporary Urban Design Theory
Credits: 3. Contact Hours: Lecture 3.
Current urban design theory and its application to urban problems. Credit counts toward fulfillment of History, Theory, Culture requirements.

ARCH 5760: Study Abroad Options
Credits: 1-12. Contact Hours: Lecture 12.
Repeatable, maximum of 12 credits.
Special topics in environmental design, architectural history and contemporary practice. Travel to relevant countries. General cultural and historical studies, topical projects and individual inquiry. Courses may be taught by departmental faculty or faculty from approved Iowa State Study Abroad programs. See current offerings for detailed syllabus. Meets International Perspectives Requirement. (Typically Offered: Summer)

ARCH 5790X: Methods for Interdisciplinary Research
(Cross-listed with HCI 5790X).
Credits: 3. Contact Hours: Lecture 3.
Introduction to qualitative, quantitative, and experimental methods for interdisciplinary research. Themes drawn from architectural history, design fields, human computer interaction, and applied social sciences; guest speakers attend to present their research methodologies. Students develop a research paper on a topic of their choice.

ARCH 5810: Making and Material Practice
Credits: 5. Contact Hours: Lecture 1, Studio 12.
Planning and execution of a project serving a community need. Learning occurs through both theory and active involvement in on-site work. Projects connect previous coursework to practical applications and community involvement. (Typically Offered: Summer)

ARCH 5820: Professional Practice
(Dual-listed with ARCH 4820).
Credits: 3. Contact Hours: Lecture 3.
Emphasis on the circumstances and opportunities of the professional practice of architecture: practice as profession, process, organization, business, and evolving models of practice. (Typically Offered: Fall)

ARCH 5900: Special Topics
Credits: 1-5. Repeatable.
Prereq: Instructor Permission for Course
Investigation of architectural issues having a specialized nature.

ARCH 5950: Seminar on the Built Environment I: History
Credits: 3. Contact Hours: Lecture 3.
Introduction to historical canons and traditions of architecture and urbanism. Discussion of the relationship between historical inquiry and contemporary practice. Students learn skills in critical thinking, visual analysis, and research methods. Course sessions develop thematically with interdisciplinary readings, group discussions, student presentations, and research projects. (Typically Offered: Fall)

ARCH 5960: Seminar on the Built Environment II: Landscape and Society
Credits: 3. Contact Hours: Lecture 3.
Introduction to landscape as artifact and multi-disciplinary knowledge-base for design thinking. Literatures and methods of environmental psychology, cultural geography, landscape and architectural history and theory, site and circulation design as intersection of built infrastructural, natural, and social systems. Emphasis on sensory perception, and human movement; investigations of climate, environmental conditions, and values toward consumption and sustainability in everyday experience of the built environment. (Typically Offered: Spring)

ARCH 5970: Seminar on the Built Environment III: Theory
Credits: 3. Contact Hours: Lecture 3.
Multidisciplinary overview of contemporary theories concerned with the production of the built environment. Particular attention to urbanism as a discourse that relates social interactions and power structures to material space. Credit counts toward fulfillment of History, Theory, Culture requirements. Meets International Perspectives Requirement. (Typically Offered: Fall)

ARCH 5980: Seminar on the Built Environment IV: Topical Study
Credits: 3. Contact Hours: Lecture 3.
A research seminar which considers a topic within contemporary discourses on the built environment outside of Europe and North America. The topic will be studied from multiple perspectives highlighting the historical and theoretical relationships between architecture, global cultures, geography, landscape, and urban planning. Credit counts toward fulfillment History, Theory, Culture requirements. (Typically Offered: Spring)

Courses for graduate students:

ARCH 6010: Sustainable Building Design
Credits: 6. Contact Hours: Studio 12.
Design projects that are developed through integrative design strategies that explore the relationship between buildings and environmental forces to maximize non-wasteful, efficient use of resources such as energy, water and building materials. Projects will include investigations of the impact of solar energy, airflow, building materials, passive and active systems and wall sections on spatial quality and form making while demonstrating synthesis of user requirements, regulatory requirements, site conditions, and accessible design. Design decisions will be quantitatively validated through energy modeling and performance simulation. (Typically Offered: Fall)

ARCH 6020: Communities, Architecture and the Environment
Credits: 6. Contact Hours: Studio 12.
Design projects that explore the relationships between architectural, cultural, and environmental landscapes. Emphasis on regional sites, socio-economic conditions, and sustainable design and planning practices at multiple scales. Projects stress engagement with local circumstances and stakeholders; systemic interconnections and strategies; and the application of interdisciplinary research. (Typically Offered: Spring)

ARCH 6030: Integrative Design
Credits: 6. Contact Hours: Studio 12.
Repeatable.
Rigorous examination of architecture's relationship with culture and technology. Studio projects stress the interpretation of contextual and historical considerations while demonstrating broad integration and consideration of environmental stewardship, technical documentation, accessibility, site conditions, life safety, environmental systems, structural systems, and building envelope systems and assemblies. This course fulfills the Graduate College Creative Component Requirement. (Typically Offered: Fall)

ARCH 6040: Design Studio Options
Credits: 6. Contact Hours: Studio 12.
Repeatable, maximum of 12 credits.
Design studio selected by the students, which may include but is not limited to: independent design study, interdisciplinary design studio, study abroad, and design build. DSNS 5460 for 6 cr. may be substituted for this course. (Typically Offered: Spring)

ARCH 6410: Building Science and Technology III
Credits: 3.
Synthesis of building technologies and design process to understand the impacts of building technologies on occupants and the natural/urban environment. Lectures and labs cover active environmental control systems, fire safety, transportation, constructed building assemblies and details, multi-story structural design, and the utilization of computational simulations.

ARCH 6420: Building Science and Technology IV
Credits: 3. Contact Hours: Lecture 2, Studio 2.
Explorations of emerging building technologies and their impacts on the environment and society. A view into emerging technologies in architecture with an emphasis on adaptability through experimentation and inquiries. Topics include novel materials, assembly techniques, long-span structural systems, renewable energy production, and smart systems.

ARCH 6900: Independent Design Study
Credits: 6. Repeatable.
Prereq: Instructor Permission for Course
Independent architectural design projects commensurate with student interests requiring approval of Architecture Graduate Committee.

ARCH 6980: Graduate Seminar
Credits: Required. Contact Hours: Lecture 1.
Repeatable.
Special topics and guest speakers. (Typically Offered: Fall, Spring)

ARCH 6990: Research
Credits: 1-9. Repeatable.
Prereq: Instructor Permission for Course
Research.