

ARCH-ARCHITECTURE

ARCH 1121 Methods I - Introduction to Creating-Making 1 Credit Hour

Corequisite: ARCH 1112, ARCH 1154. An introduction to the historical and theoretical issues forming and informing the built environment. The relationships of conceptual, methodological, and representational skills related to designed environments will be introduced and developed. Design vocabulary, studio culture, and architectural discourse will be explored and related within the framework of Creating-Making. (F)

ARCH 1154 Design I - Design Fundamentals 4 Credit Hours

Corequisite: ARCH 1112 and ARCH 1121. Development of foundational design, visual communication skills, and graphic conventions including sketching and drafting, shade and shadow, rendering methods, perspective, color, materials, and model building. Introduces processes of creating-making through methods engaged in critical thinking and experiential knowing. Methods of composition are introduced and explored: design elements and principles, proportion and scale, ordering systems, and organizational strategies. Introduction to issues of craft and material engagement. (F)

ARCH 1155 Design I - Design Fundamentals 5 Credit Hours

Prerequisite: Co-requisites: ARCH 1163 or permission of director. Development of foundational design and representational skills, and graphic conventions including sketching and digital methods. The course introduces processes of Creating-Making through methods engaged in critical thinking and experiential knowing. Methods of composition are introduced and explored: design elements and principles, proportion and scale, ordering systems, and organizational strategies. Introduction to issues of craft and material engagement. (F)

ARCH 1163 Methods I - Materiality of Place 3 Credit Hours

Prerequisite: Co-requisites: ARCH 1155 or permission of director. Introduction to the historical and theoretical issues forming and informing the development of the built environment. The relationships of conceptual, methodological, and representational skills related to designed environments will be introduced and developed. Design vocabulary, studio culture, and architectural discourse will be explored and related within the framework of Creating-Making. (F)

ARCH 1223 Methods II - Material Awareness 3 Credit Hours

Prerequisite: ARCH 1121, ARCH 1112, and ARCH 1154 with a grade of C or better. Corequisite: ARCH 1254. An introduction to the influences of materials and technology on designed environments. Introduction of the historical development and application of basic architectural technology. Introduction to structural systems and components and to the formal/spatial/material characteristics of building technology. (Sp)

ARCH 1255 Design II - Craft and Making 5 Credit Hours

Prerequisites: ARCH 1112, ARCH 1163, ARCH 1153 with a grade of C or better. Co-requisite: ARCH 1263; or permission of director. A continuation in the development of fundamental design skills through introductions to the material, formal, and spatial properties of architecture. Fabrication safety, craft, and techniques will be introduced and developed through the making of full-scale constructions. Continued ideas involving Creating-Making are explored through exercises in the formal, spatial, and material qualities of human environments. (Sp)

ARCH 1263 Methods II - Pattern of Architecture 3 Credit Hours

Prerequisites: ARCH 1112, ARCH 1163, ARCH 1153 with a grade of C or better. Co-requisite: ARCH 1255; or permission of director. An introduction to organizational strategies across a range of architectural scales. Ordering principles are investigated from micro through macro, from the materiality and tectonics of details, to urban patterns. Architectural assemblies and building technology will introduce structural systems and material characteristics. Massing and typology studies will introduce relationships of building to site and environment. (Sp)

ARCH 2243 History of the Built Environment I 3 Credit Hours

Prerequisite: majors only or permission of director. Co-requisite: ARCH 2363, ARCH 2356; for Interior Design majors: completion of A HI 2213 and A HI 2223. A theoretical investigation of the cultural, political, and aesthetic values of diverse Western and non-Western cultures and how these affect the built environment from pre-history through the Renaissance. This course continues the development of critical writing skills and further develops analytic skills that act to inform design decisions related to studio projects. (F) [IV-WC].

ARCH 2323 Methods III - Design Analytics 3 Credit Hours

Prerequisite: ARCH 1223, ARCH 1254 with a grade of C or better. Corequisite: ARCH 2354, ARCH 2243. An introduction to historical precedent, human factors, and the physical and cultural contexts associated with the built environment. The contextual relationships between building, site, and culture will be explored through an introduction to various environmental and site design concepts, skills, and methods appropriate for architects. (F)

ARCH 2343 History of the Built Environment II 3 Credit Hours

Prerequisites: ARCH 2363, ARCH 2356, ARCH 2243. Co-requisites: ARCH 2463, ARCH 2456, ARCH 4193; or permission of director. An investigation of the cultural, political, and aesthetic values of diverse Western and non-Western cultures and how these have affected the built environment from the Renaissance through the 19th century. This course continues the development of critical writing skills and further develops analytic skills that act to inform design decisions related to studio projects. (Sp)

ARCH 2356 Design III - Crafting Place 6 Credit Hours

Prerequisites: ARCH 1263, ARCH 1255 with a grade of C or better. Corequisites: ARCH 2363, ARCH 2243; or permission of director. Development of formal and spatial architectural components that demonstrate engagement with design principles, precedent analysis, human factors, and environmental and cultural influences on design. Expression of ideas through the application of virtual techniques of representation and visual communication are required. (F)

ARCH 2363 Materials and Form 3 Credit Hours

(Crosslisted with CNS 2363) Prerequisite: Majors only. An introduction to the nature of building materials with regard to form, strength, durability, workability, structure, connections, surfaces, and edges. Analysis of architectural expression through the use of building materials including the effects of: light, air movement, humidity, and their relationships to both one another and formal and spatial expressions. (F)

ARCH 2456 Design IV - Materials and Making 6 Credit Hours

Prerequisite: ARCH 2363, ARCH 2356, ARCH 2243 with a grade of C or better. Corequisites: ARCH 2463, ARCH 2343, and ARCH 4193; Majors only; or permission of director. Introduces projects of moderate complexities demonstrating intermediate design principles within the context of the urban environment demonstrating an understanding of material. Students begin to engage the effects of site and environmental conditions upon material, formal, and spatial design decisions. (Sp)

ARCH 2463 Methods IV- Sustainable and Resilient Systems

I 3 Credit Hours
Prerequisite: ARCH 2363, ARCH 2356, and ARCH 2243 with a grade of C or better. Co-requisites: ARCH 2456, ARCH 2343, ARCH 4193; or permission of director. Introduction to psychrometrics, heat transmission, mechanical heating and cooling, natural ventilation, passive solar conditioning, plumbing, and fire protection in buildings. (Sp)

ARCH 3013 Architecture for Non-Majors 3 Credit Hours

Prerequisite: junior standing. An introduction of basic principles of architecture for the non-architect. Understanding of the qualities and characteristics of a well-designed architectural environment. Not open to architecture majors. (F, Sp) [IV-AF].

ARCH 3440 Mentored Research Experience 3 Credit Hours

0 to 3 hours. Prerequisites: ENGL 1113 or equivalent, and permission of instructor. May be repeated; maximum credit 12 hours. For the inquisitive student to apply the scholarly processes of the discipline to a research or creative project under the mentorship of a faculty member. Student and instructor should complete an Undergraduate Research & Creative Projects (URCP) Mentoring Agreement and file it with the URCP office. Not for honors credit. (F, Sp, Su)

ARCH 3556 Design V - Architectural Making I 6 Credit Hours

Prerequisite: ARCH 2463, ARCH 2456, ARCH 2343, and ARCH 4193 with a grade of C or better. Co-requisites: ARCH 4563, ARCH 4233, ARCH 4453; or permission of director. Introduces principles and techniques of site design within a building context of place, order, form, and structure. It also introduces climatic data analysis software as a means for teaching evidence based design and sustainable design principles. Studio-based lectures and assignments will challenge students to analyze, adapt to, and transform the site within a building design context. (F)

ARCH 3656 Design VI - Architectural Making II 6 Credit Hours

Prerequisites: ARCH 4563, ARCH 3556, ARCH 4233, ARCH 4453 with a grade of C or better. Co-requisites: ARCH 4663, ARCH 4543; or permission of director. Students develop the ability to design in the context of existing urban environments. Students are challenged to take into account the layered histories of cities as well as the complexities of dealing with site and street design for urban contexts. Course features guest lectures from experts on urban design and planning; and special topics pertaining to individual studio programs. (Sp)

ARCH 3960 Honors Reading 1-3 Credit Hours

1 to 3 hours. Prerequisite: admission to Honors Program. May be repeated; maximum credit six hours. Consists of topics designated by the instructor in keeping with the student's major program. The topics will cover materials not usually presented in the regular courses. (F, Sp, Su)

ARCH 3970 Honors Seminar 1-3 Credit Hours

1 to 3 hours. Prerequisite: admission to Honors Program. May be repeated; maximum credit six hours. The projects covered will vary. The content will deal with concepts not usually presented in regular coursework.

ARCH 3980 Honors Research 1-3 Credit Hours

1 to 3 hours. Prerequisite: admission to Honors Program. Provides an opportunity for the gifted Honors candidate to work at a special project in the student's field. (F, Sp)

ARCH 3990 Independent Study 1-3 Credit Hours

1 to 3 hours. Prerequisite: permission of instructor and junior standing. May be repeated once with change of content. Independent study may be arranged to study a subject not available through regular course offerings. (F, Sp, Su)

ARCH 4053 Methods X- Tool of Practice 3 Credit Hours

(Slashlisted with ARCH 5053) Prerequisites: ARCH 4923, ARCH 4956 with a grade of C or better. Co-requisites: ARCH 4056 or permission of director. Explores issues in contemporary architectural practice including the role of the client, contracts, practice and project management, leadership skills, legal responsibilities, and ethics. Emphasis is placed upon issues of cultural and environmental sustainability, political activism, and the changing role of the architecture profession. The course contains program specific research and support related to studio projects. No student may earn credit for both 4053 and 5053. (Sp)

ARCH 4056 Design X- Options Studio II 6 Credit Hours

Prerequisites: ARCH 4723, ARCH 4756, and ARCH 4333 with a grade of C or better. Co-requisites: ARCH 4053; or permission of director. Emphasizes the development of a complete project from schematic design through design development and construction detailing. Students will develop a building of limited programmatic complexity through more complete technical development. This course addresses and builds upon the collaborative and analytic knowledge developed in ARCH 4756. (Sp)

ARCH 4160 Internship 0 Credit Hours

(Slashlisted with ARCH 5160) Prerequisite: ARCH 4723, ARCH 4756; or permission of director. This internship requirement corresponds with the National Council of Architectural Registration Boards Internship Development Program (IDP) and provides students with experience in an architecture office or in a related field. Students must follow the Division's Internship Program Guidelines in order to verify the appropriate experience is gained and documented. No student may earn credit for both 4160 and 5160. (F, Sp, Su)

ARCH 4173 Cinema and Architecture of the City 3 Credit Hours

Prerequisite: junior standing. An examination of urban morphology and city life from antiquity through the capital cities of the 21st century. Investigates the understanding of cities, civic culture and ritual, public and private space, the role of the architect and the city planner, cultural and formal complexity, and adaptation to change. Fosters conceptualization of the urban physical system, and general theories that purport to explain its form and function. No student may earn credit for both 4173 and 5173. (Sp)

ARCH 4183 Survey of Middle Eastern Architecture 3 Credit Hours

(Slashlisted with 5183) Prerequisite: Junior standing or permission of instructor. Survey of Middle Eastern architecture and the impact architects and architecture from this time and region had upon the advancement of environmental/urban design throughout the rest of history. No student may earn credit for both 4183 and 5183. (Irreg.) [IV-NW].

ARCH 4193 Architectural Structures I 3 Credit Hours

(Slashlisted with ARCH 5193; Crosslisted with CNS 4193) Prerequisite: Architecture major and completion of MATH 1523 and PHYS 1114; or Construction Science major and completion of PHYS 2414 and MATH 1523; or permission of division director. An introduction to basic physics, forces within structural systems, material strength, and associated structural engineering principles. Develops both intuitive and empirical knowledge of forces within structural systems that serve as a foundation for future courses within the Structures sequence. No student may earn credit for both 4193 and 5193. (Sp)

- ARCH 4233 Architectural Structures II 3 Credit Hours**
(Slashlisted with ARCH 5233; Crosslisted with CNS 4233) Prerequisite: ARCH 4193 or CNS 4193; majors only. Focus is on wood, concrete, and steel as structural materials. Material properties, common manufactured systems, common material sections, and common connection types will be explored with students demonstrating the ability to develop technical details related to various structural systems. No student may earn credit for both 4233 and 5233. (F)
- ARCH 4283 Persian Architecture 3 Credit Hours**
(Slashlisted with ARCH 5283) Prerequisite: junior standing. The goal of the course is to guide students into an understanding of the important contributions that Persian Architecture has made to the built environment. This course provides a comprehensive history of ancient Iranian architecture and urbanism, from the first societies to the present. No student may earn credit for both 4283 and 5283. (Sp)
- ARCH 4333 Advanced Structures 3 Credit Hours**
(Slashlisted with ARCH 5333) Prerequisite: ARCH 4193 and ARCH 4233; or permission of director. Introduces design of structural members using reinforced concrete. It covers the structural concrete, loads, analyses of tension and compression members, bending design for beams, axial load design for columns, structural systems, and design of reinforced concrete buildings. Concrete structures as taught for architects emphasizes principles of design rather than formulaic calculations. It emphasizes learning through project based collaborations. No student may earn credit for both 4333 and 5333. (F)
- ARCH 4353 LEED Seminar 3 Credit Hours**
Prerequisite: senior standing. Gives a comprehensive understanding of leadership in energy and environmental design (LEED) and the certification process. Students acquire first-hand experience in the process of "greening up" a campus. Prepares students with the knowledge necessary to sit for and pass the LEED certification exam. (F, Sp)
- ARCH 4363 Sustainability: Ethics, Efficiency, Community & Design 3 Credit Hours**
Prerequisite: senior standing. Addresses sustainability in terms of ethics, efficiency, community and design. Readings and discussions expose students to a macro-to-micro matrix of issues which establish a context for 'sustainability'. (F)
- ARCH 4433 Rendering 3 Credit Hours**
Prerequisite: senior standing. Helps students develop a more advanced understanding of graphic presentation principles and the use of pen and pencil, marker, and water color in developing presentation floor plans, sections, elevations and 3-D renderings. (Sp)
- ARCH 4453 Modern and Contemporary Architecture 3 Credit Hours**
(Slashlisted with ARCH 5453) Prerequisite: Junior level standing; or permission of director. The course focus is on the relationship between architectural theories and projects during culture and the modern era. It considers how particular historical contexts shaped theories of design as well as how architects responded to the change. The course examines the relationship between the constructed environment and notions of modernity, developments in technology, building traditions, and politics. No student may earn credit for both 4453 and 5453. (F)
- ARCH 4513 Creativity Through Sketching 3 Credit Hours**
(Slashlisted with ARCH 5513) Prerequisite: ENGL 1213 or EXPO 1213. This course teaches students how to express themselves creatively through sketching. Students receive instruction and assignments tailored to help them learn basic sketching techniques with the aim of developing their own expressive means of communicating through sketching. No student may earn credit for both 4513 and 5513. (F) [IV-AF].
- ARCH 4523 Methods V - Thermal Systems 3 Credit Hours**
Prerequisite: ARCH 2343, ARCH 2423, and ARCH 2454. Corequisite: ARCH 4193, ARCH 4453 and ARCH 3555. Introduction to psychometrics, heat transmission in buildings, heating, air conditioning and ventilation, solar heat gain, passive solar conditioning, plumbing, and fire protection. (F)
- ARCH 4543 Architectural Theory and Criticism 3 Credit Hours**
(Slashlisted with ARCH 5543) Prerequisite: Junior level standing; or permission of director. The development of research and academic writing in an urban and architectural context. Development of critical and analytical writing skills through the use of original research and/or analysis term papers. Topics may range from periods, politics, technology, economics, religion, gender, and culture. Open to non-architecture majors to encourage interdisciplinary research/writing. No student may earn credit for both 4543 and 5543. (Sp)
- ARCH 4563 Methods V- Sustainable and Resilient Systems II 3 Credit Hours**
(Slashlisted with ARCH 5563) Prerequisite: ARCH 2463, ARCH 2456, ARCH 2343, ARCH 4193 with a grade of C or better. Co-requisite: ARCH 3556, ARCH 4453, ARCH 4233; or permission of director. Introduction to plumbing, lighting, acoustics, and other auxiliary systems that impact the Creating-Making of the built environment. These systems are discussed in relation to issues of sustainability and human comfort. Codes and standards that effect building design will be introduced and discussed. No student may earn credit for both 4563 and 5563. (F)
- ARCH 4663 Methods VI- Urban Design Methodologies 3 Credit Hours**
(Slashlisted with ARCH 5663). Prerequisites: ARCH 4563, ARCH 3556, ARCH 4233, ARCH 4453 with a grade of C or better. Co-requisites: ARCH 3656, ARCH 4543 or permission of program director. Provides an introduction to urban design, an overview of its history, and a cross section of contemporary strategies to effect desired urban design conditions. The course content may support design work developed in studios of the architecture curriculum. Students may not earn credit for both 4663 and 5663. (Sp)
- ARCH 4723 Methods VII - Advanced Systems 3 Credit Hours**
(Slashlisted with ARCH 5723) Prerequisites: ARCH 4543, ARCH 4663, ARCH 3656 with a grade of C or better. Co-requisites: ARCH 4756; or permission of director. Introduction to advanced issues of structure, building systems, sustainability, and integrated building management systems. Course material will develop advanced understanding of the theories and practices of these complex systems and their effects on the built environment. No student may earn credit for both 4723 and 5723. (F)
- ARCH 4756 Design VII - Systems and Context 6 Credit Hours**
Prerequisites: ARCH 4543, ARCH 4663, ARCH 3656 with a grade of C or better. Co-requisites: ARCH 4723; or permission of director. This capstone course emphasizes the relationship of schematic design to contract documents through a broad exploration of structural, mechanical, electrical, plumbing, and other buildings systems. It builds on the fundamental issues of place, order, form, structure, site and programming. It is also dedicated to developing interdisciplinary and collaborative skills through team-based projects and other small group exercises. (F) [V].

- ARCH 4773 Computational Design and Fabrication 3 Credit Hours**
(Slashlisted with ARCH 5773) Prerequisite: senior standing or permission of instructor. Computational design allows architects to explore tectonics and space in relationship to various data sets such as environmental, programmatic, and material. Computational design is a design strategy where architects incorporate ideas from fields such as mathematics, computer science, system science, morphogenesis and evolution. The class will examine the work flow from computational design through to digital fabrication. Students may not earn credit for both 4773 and 5773. (F)
- ARCH 4783 Architectural Acoustics 3 Credit Hours**
(Slashlisted with ARCH 5783) Prerequisite: 3rd, 4th or 5th year student in the College of Architecture. Focuses primarily on the nature of architectural acoustics based on material choices, surface arrangement, and the overall shaping of space to promote natural acoustics. There will also be some discussion concerning natural lighting and how design decisions for lighting and acoustics can work in unison. Students may not earn credit for both 4783 and 5783. (Irreg.)
- ARCH 4855 Design VIII - Architectural Synthesis 5 Credit Hours**
Prerequisite: ARCH 4333, ARCH 4723, and ARCH 4755, all with a grade of C or better. Corequisite: ARCH 4823. Emphasizes the development of a complete project from schematic design through design development and construction detailing. Students develop a building of limited programmatic complexity through more complete technical development. The application of Building Information Modeling software will be required. Also addresses and builds upon the collaborative and analytic knowledge developed in ARCH 4755. (Sp)
- ARCH 4863 Methods VIII - Building Performance Analytics 3 Credit Hours**
(Slashlisted with ARCH 5863) Pre-requisite: ARCH 4723, ARCH 4756; or permission of director. Advanced level survey course investigating the wide variety of computer-based applications available for making sustainable design decisions. Case studies are used to clarify information presented. Laptops, smartphones, tablets required with skill development in the acquisition, installation and evaluation of software used for sustainable design analysis. Exploration of Building Performance Analytics available through Building Information Modeling (BIM). No student may earn credit for both 4863 and 5863. (Sp)
- ARCH 4923 Methods IX- Entrepreneurial Architect and Leadership 3 Credit Hours**
(Slashlisted with ARCH 5923) Prerequisites: ARCH 4723, ARCH 4756, ARCH 4333 with a grade of C or better. Co-requisites: ARCH 4956; or permission of director. Explores finance and leadership issues that currently confront the development, design, and construction industries. Expertise and decision-making capabilities with be explored. No student may earn credit for both 4923 and 5923. (F)
- ARCH G4940 Field Work 1-4 Credit Hours**
1 to 4 hours. Prerequisite: senior standing and permission of instructor. Field study related to the student's area of interest in a position approved by the instructor. One hour credit per 120 hours of field work or equivalent. Documentation and evaluation is required. (F, Sp, Su)
- ARCH 4956 Design IX- Options Studio I 6 Credit Hours**
Prerequisites: ARCH 4723, ARCH 4756, ARCH 4333 with a grade of C or better. Co-requisites: ARCH 4923; or permission of director. Advanced architectural design projects which incorporate an increased complexity and scale. The projects vary in type and scope which includes service learning and design competitions. (F)
- ARCH 4960 Directed Readings 1-4 Credit Hours**
1 to 4 hours. Prerequisite: senior standing and permission of instructor. May be repeated with change of subject; maximum credit 12 hours. (F, Sp, Su)
- ARCH G4970 General Departmental Seminar 1-6 Credit Hours**
1 to 6 hours. Prerequisite: senior or graduate standing, or permission of instructor. May be repeated with change of content. Special topics in architecture. (F, Sp, Su)
- ARCH 4990 Independent Study 1-3 Credit Hours**
1 to 3 hours. Prerequisite: four courses in general area to be studied; permission of instructor and department. May be repeated; maximum credit six hours. Contracted independent study for topic not currently offered in regularly scheduled courses. (F, Sp)
- ARCH 5023 Architectural Seminar 3 Credit Hours**
Prerequisite: junior standing or permission of instructor. May be repeated with change of subject matter; maximum credit 12 hours. Investigation and discussion based upon the following topics: design methods, architectural research, history and theory, environmental processes, structural theory, visual perception, urban design and other related topics. (F, Sp)
- ARCH 5053 Methods X - Tools of Practice 3 Credit Hours**
(Slashlisted with ARCH 4053) Prerequisites: Program admission or permission of graduate liaison. Explores issues in contemporary architectural practice including the role of the client, contracts, practice and project management, leadership skills, legal responsibilities, and ethics. Emphasis is placed upon issues of cultural and environmental sustainability, political activism, and the changing role of the architecture profession. The course contains program specific research and support related to studio projects. No student may earn credit for both 4053 and 5053. (Sp)
- ARCH 5055 Design X - Comprehensive Architecture II 5 Credit Hours**
Prerequisite: ARCH 5922, ARCH 5955, or permission of graduate liaison. Corequisite: 5022. A continuation of ARCH 5955. Students are expected to further develop their project to a level of Design Development and limited Construction Detailing. The course encourages the continued exploration, speculation, and experimental innovation begun in Design IX extended into materials detailing, construction methods, mechanical systems, and creative spatial and aesthetic development. Component and assembly prototyping and performance modeling are included. (Sp)
- ARCH 5143 Architectural History 3 Credit Hours**
Prerequisite: Program admission or permission of graduate liaison. A theoretical investigation of the cultural, political, and aesthetic values of diverse Western and non-Western cultures and how these affect the built environment. This course continues the development of critical writing skills and further develops analytic skills that act to inform design decisions related to studio projects. (F)
- ARCH 5160 Internship 0 Credit Hours**
(Slashlisted with ARCH 4160) Prerequisite: Program admission or permission of graduate liaison. This internship requirement corresponds with the National Council of Architectural Registration Boards Internship Development Program (IDP) and provides students with experience in an architecture office or in a related field. Students must follow the Division's Internship Program Guidelines in order to verify the appropriate experience is gained and documented. No student may earn credit for both 4160 and 5160. (F, Sp, Su)

- ARCH 5173 Cinema and Architecture of the City 3 Credit Hours**
Prerequisite: graduate standing or permission of instructor. An examination of urban morphology and city life from antiquity through the capital cities of the 21st century. Investigates the understanding of cities, civic culture and ritual, public and private space, the role of the architect and the city planner, cultural and formal complexity, and adaptation to change. Fosters conceptualization of the urban physical system, and general theories that purport to explain its form and function. No student may earn credit for both 4173 and 5173. (Sp)
- ARCH 5183 Survey of Middle Eastern Architecture 3 Credit Hours**
(Slashlisted with 4183) Prerequisite: Graduate standing or permission of instructor. Survey of Middle Eastern architecture and the impact architects and architecture from this time and region had upon the advancement of environmental/urban design throughout the rest of history. No student may earn credit for both 4183 and 5183. (Irreg.)
- ARCH 5193 Architectural Structures I 3 Credit Hours**
(Slashlisted with ARCH 4193) Prerequisite: graduate standing and majors only; or permission of graduate liaison. An introduction to basic physics, forces within structural systems, material strength, and associated structural engineering principles. Develops both intuitive and empirical knowledge of forces within structural systems that serve as a foundation for future courses within the Structures sequence. No student may earn credit for both 4193 and 5193. (Sp)
- ARCH 5233 Architectural Structures II 3 Credit Hours**
(Slashlisted with ARCH 4233) Prerequisite: Program admission or permission of graduate liaison. Focus is on wood, concrete, and steel as structural materials. Material properties, common manufactured systems, common material sections, and common connection types will be explored with students demonstrating the ability to develop technical details related to various structural systems. No student may earn credit for both 4233 and 5233. (F)
- ARCH 5283 Persian Architecture 3 Credit Hours**
(Slashlisted with ARCH 4283) Prerequisite: graduate standing. The goal of the course is to guide students into an understanding of the important contributions that Persian Architecture has made to the built environment. This course provides a comprehensive history of ancient Iranian architecture and urbanism, from the first societies to the present. No student may earn credit for both 4283 and 5283. (Sp)
- ARCH 5333 Advanced Structures 3 Credit Hours**
(Slashlisted with ARCH 4333) Prerequisite: Program admission or permission of graduate liaison. Introduces design of structural members using reinforced concrete. It covers the structural concrete, loads, analyses of tension and compression members, bending design for beams, axial load design for columns, structural systems, and design of reinforced concrete buildings. Concrete structures as taught for architects emphasizes principles of design rather than formulaic calculations. It emphasizes learning through project based collaborations. No student may earn credit for both 4333 and 5333. (F)
- ARCH 5363 Methods III- Materials and Form 3 Credit Hours**
Prerequisite: Program admission or permission of graduate liaison. Introduction to the nature of building materials with regard to form, strength, durability, workability, structure, connections, surfaces, and edges. Analysis of architectural expression through the use of building materials including the effects of: light, air movement, humidity, and their relationships to both one another and formal and spatial expressions. (F)
- ARCH 5453 Modern and Contemporary Architecture 3 Credit Hours**
(Slashlisted with ARCH 4453) Prerequisite: Program admission or permission of graduate liaison. The course focus is on the relationship between architectural theories and projects during culture and the modern era. It considers how particular historical contexts shaped theories of design as well as how architects responded to the change. The course examines the relationship between the constructed environment and notions of modernity, developments in technology, building traditions, and politics. No student may earn credit for both 4453 and 5453. (F)
- ARCH 5463 Advanced Sustainable and Resilient Systems 3 Credit Hours**
Prerequisite: Majors only or permission of graduate liaison. Emphasis upon psychometrics, heat transmission, natural ventilation, passive solar conditioning, water usage and how they relate to mechanical heating and cooling, and fire protection in buildings. The course will be held as a seminar allowing further discussion within groups and graduate students will be required to present their work to class. No student may earn credit for 2463 and 5463. (Sp)
- ARCH 5513 Creativity Through Sketching 3 Credit Hours**
(Slashlisted with ARCH 4513) Prerequisite: Graduate standing or instructor permission. This course teaches students how to express themselves creatively through sketching. Students receive instruction and assignments tailored to help them learn basic sketching techniques with the aim of developing their own expressive means of communicating through sketching. No student may earn credit for both 4513 and 5513. (F)
- ARCH 5516 Graduate Architectural Design I 6 Credit Hours**
Prerequisite: Program admission or permission of the graduate liaison. Introduces projects of moderate complexities demonstrating intermediate design principles within the context of the built environment. Application of both physical and virtual communication skills as professional techniques of representation and communication are required. (F)
- ARCH 5526 Graduate Architectural Design II 6 Credit Hours**
Prerequisite: Program admission or permission of graduate liaison. Continuation of ARCH 5126 with an introduction to passive and active forms of lighting, acoustics, conveyance systems, and electrical systems. An emphasis will be placed on the relation between these auxiliary building systems and Creating-Making. Issues of sustainability including environmental impacts, resource utilization, ethical resource efficiencies and performance-based design will be related to concepts of Creating-Making. Codes and standards that effect the built environment will be explored. (Sp)
- ARCH 5536 Graduate Architectural Design III 6 Credit Hours**
Prerequisite: Program admission or permission of graduate liaison. Emphasis is on the relationship of schematic design to contract documents in order to understand structural, mechanical, electrical, plumbing, and other systems within buildings. Students demonstrate an understanding of drafting conventions, the production of traditional contract documents, Building Information Modeling, and the communication of additional solutions necessary for construction. The course develops interdisciplinary and collaborative skills through team projects. (F) [M].

- ARCH 5543 Architectural Theory and Criticism 3 Credit Hours**
(Slashlisted with ARCH 4543) Prerequisite: Program admission or permission of graduate liaison. The development of research and academic writing in an urban and architectural context. Development of critical and analytical writing skills through the use of original research and/or analysis term papers. Topics may range from periods, politics, technology, economics, religion, gender, and culture. Open to non-architecture majors to encourage interdisciplinary research/writing. No student may earn credit for both 4543 and 5543. (Sp)
- ARCH 5546 Graduate Architectural Design IV 6 Credit Hours**
Prerequisite: Program admission or permission of graduate liaison. Emphasis is on the development of a complete project from schematic design through design development and construction detailing. Students will develop a building of limited programmatic complexity through more complete technical development. The application of Building Information Modeling software will be required. This course addresses and builds upon the collaborative and analytic knowledge developed in ARCH 5423. (Sp)
- ARCH 5563 Methods V- Sustainable and Resilient Systems II 3 Credit Hours**
(Slashlisted with ARCH 4563) Prerequisites: Program admission or permission of graduate liaison. Introduction to plumbing, lighting, acoustics, and other auxiliary systems that impact the Creating-Making of the built environment. These systems are discussed in relation to issues of sustainability and human comfort. Codes and standards that effect building design will be introduced and discussed. No student may earn credit for both 4563 and 5563. (F)
- ARCH 5643 Urban Design Analytics 3 Credit Hours**
Prerequisite: graduate standing in architecture or regional and city planning. A survey of analysis techniques applicable to the field of urban design, including the interpretation of basic demographic statistics, an introduction to survey and observation research techniques, visual survey methodologies, environmental assessment strategies, forecasting, gaming and decision analysis. (Sp)
- ARCH 5653 Urban Design Seminar 3 Credit Hours**
(Crosslisted with RCPL 5653) Prerequisite: permission of instructor. May be repeated with change of content; maximum credit six hours. Advanced seminar in urban design problems and issues through an in-depth and on-site investigation and evaluation of significant national and international urban development projects. Topics covered will be announced by instructor in the term prior to course offerings. (F, Sp)
- ARCH 5663 Methods VI- Urban Design Methodologies 3 Credit Hours**
(Slashlisted with ARCH 4663) Pre-requisites: Program admission or permission of graduate liaison. Provides an introduction to urban design, an overview of its history and a cross section of contemporary strategies to effect desired urban design conditions. The course content may support design work developed in studios of the architecture curriculum. No student may earn credit for both 4663 and 5663. (Sp)
- ARCH 5713 Real Estate I 3 Credit Hours**
Prerequisite: graduate standing or permission of instructor. An introductory course which surveys the real estate development process. (F)
- ARCH 5723 Methods VII-Advanced Systems 3 Credit Hours**
(Slashlisted with ARCH 4723) Prerequisite: Program admission or permission of graduate liaison. This course introduces students to advanced issues of structure, building systems, sustainability, and integrated building management systems. Course material will develop advanced understanding of the theories and practices of these complex systems and their effects on the built environment. No student may earn credit for both 4723 and 5723. (F)
- ARCH 5743 Legal Framework for Design 3 Credit Hours**
Prerequisite: graduate standing or permission of instructor. Introduction to the legal principles relevant to real estate planning, financing, development, operation, and disposal of real property and real estate projects. (F)
- ARCH 5763 Landscape Architecture for Architects 3 Credit Hours**
Prerequisite: graduate standing or permission of instructor. Analysis and organization of the site together with the use of plant materials in landscape design. (Sp)
- ARCH 5773 Computational Design and Fabrication 3 Credit Hours**
(Slashlisted with ARCH 4773) Prerequisite: Graduate standing or instructor permission. Computational design allows architects to explore tectonics and space in relationship to various data sets such as environmental, programmatic, and material. Computational design is a design strategy where architects incorporate ideas from fields such as mathematics, computer science, system science, morphogenesis and evolution. The class will examine the work flow from computational design through to digital fabrication. No student may earn credit for both 4773 and 5773. (F)
- ARCH 5783 Architectural Acoustics 3 Credit Hours**
(Slashlisted with ARCH 4783) Prerequisite: Graduate standing and permission of instructor. Focuses primarily on the nature of architectural acoustics based on material choices, surface arrangement, and the overall shaping of space to promote natural acoustics. There will also be some discussion concerning natural lighting and how design decisions for lighting and acoustics can work in unison. Students may not earn credit for both 4783 and 5783. (Irreg.)
- ARCH 5863 Methods VIII-Building Performance Analytics 3 Credit Hours**
(Slashlisted with ARCH 4863) Prerequisite: Program admission or permission of graduate liaison. Advanced level survey course investigating the wide variety of computer-based applications available for making sustainable design decisions. Case studies are used to clarify information presented. Laptops, smartphones, tablets required with skill development in the acquisition, installation and evaluation of software used for sustainable design analysis. Exploration of Building Performance Analytics available through Building Information Modeling (BIM). No student may earn credit for both 4863 and 5863.
- ARCH 5923 Methods IX - Entrepreneurial Architect and Leadership 3 Credit Hours**
(Slashlisted with ARCH 4923) Prerequisites: Program admission or permission of graduate liaison. Explores finance and leadership issues that currently confront the development, design, and construction industries. Expertise and decision-making capabilities will be explored. No student may earn credit for both 4923 and 5923. (F)
- ARCH 5930 Independent Study with Computer Applications 1-6 Credit Hours**
Prerequisite: END 1012 and permission of instructor. Contracted independent study with emphasis on computer applications in architecture. Documentation and presentation varies with nature of the problem or project.

- ARCH 5955 Design IX - Comprehensive Architecture I 5 Credit Hours**
Prerequisite: ARCH 4823, ARCH 4855 or permission of graduate liaison. Corequisite: ARCH 5922. The first of a two-semester sequence; includes the design of a moderately complex building on a contextual site. Encourages innovative exploration, analysis, speculation, and experimentation in developing schematic proposals. Students will develop an architectural program, establish pro-forma attributes, conduct feasibility studies for their chosen project, develop solutions with refined mechanical, electrical, structural, and material components. Both active and passive energy systems, issues of sustainability, issues of site and context, life safety issues, and traditional functional and aesthetic requirements will be integral to design solutions. Includes a significant focus on ethical, environmental, sustainable, social, material, and historical issues related to Creating-Making within the built environment. (F)
- ARCH 5960 Directed Readings 1-4 Credit Hours**
1 to 4 hours. Prerequisite: fifth year or graduate standing in architecture and permission of instructor. May be repeated with change of subject; maximum credit nine hours. Studies in major field as approved by instructor. (F, Sp, Su)
- ARCH 5970 General Departmental Seminar 1-4 Credit Hours**
1 to 4 hours. Prerequisite: graduate standing or permission of instructor. May be repeated; maximum credit 12 hours. Advanced professional topics in architecture, construction science, urban design or environmental design. Lectures, team and individual assignments. (F)
- ARCH 5980 Research for Master's Thesis 2-9 Credit Hours**
Prerequisite: Graduate standing. Variable enrollment, two to nine hours; Laboratory (F, Sp, Su)
- ARCH 5990 Special Studies in Architecture 1-6 Credit Hours**
1 to 6 hours. Prerequisite: fifth year or graduate standing and permission of instructor. May be repeated; maximum credit nine hours. Subject as assigned by instructor will be explored in depth. Documentation and presentation varies with nature of problem. Laboratory (Sp, Su)
- ARCH 6056 Design X- Comprehensive Architecture II 6 Credit Hours**
Prerequisite: Program admission or permission of graduate liaison. This is a continuation of ARCH 6956. The course requires further exploration, speculation, and experimental innovation of the design project begun in ARCH 6956, extending into materials detailing, construction methods, mechanical systems, and spatial and aesthetic development. Component and assembly prototyping and performance modeling are a significant component of the course. (Sp)
- ARCH 6133 Sustainable Design Analytics 3 Credit Hours**
Prerequisite: Program admission or permission of instructor. Advanced level survey course investigating the wide variety of computer-based applications available for making sustainable design decisions. Case studies are used to clarify information presented. (F)
- ARCH 6143 Theory of Sustainability 3 Credit Hours**
Prerequisite: Program admission or permission of instructor. Historical and contemporary topics in sustainable design goals, concepts, theories, and philosophies. (F)
- ARCH 6156 Graduate Studio I 6 Credit Hours**
Prerequisite: Permission of graduate liaison. The class introduces fundamental design and visual communication skills through the use of material, formal, and spatial properties of architecture. Fabrication safety, craft, and techniques will be introduced and developed through the making. Ideas involving creating-making are explored through exercises in the formal, spatial and material qualities of human environments. (Su)
- ARCH 6233 Sustainable Technology 3 Credit Hours**
Prerequisite: Program admission and 6133. In depth exploration of special topics in sustainable architecture. Subjects may be drawn from criteria for sustainable sites, water and energy efficiency, resources management, materials manufacture, and environmental quality. Documentation and presentation varies with nature of topic. (Sp)
- ARCH 6243 Research Methods and Programming 3 Credit Hours**
Prerequisite: Program admission and 6133 and 6143. Research methodology applied to relevant topics resulting in the development of a design program for the professional project in sustainable architecture. (Sp)
- ARCH 6256 Graduate Studio II 6 Credit Hours**
Prerequisite: Program admission and 6133 and 6143, and 6156. Intermediate study of sustainability and regional response: Continuation at a more informed level of readings and precedents, studio projects and field trips. Focus is on sustainable architecture that is responsive to regional conditions of custom, culture, materiality, and place. (Sp)
- ARCH 6356 Graduate Studio III 6 Credit Hours**
Prerequisite: Program admission and 6233 and 6243, and 6256. Advanced study of sustainability and regional response: Application of theory and practices to a professional project of the individual student's choosing. A faculty committee guides the student's progress to completion of a schematic design. Emphasis is on demonstrating a comprehensive understanding and integrative capability in creating architecture that is contextually responsive and environmentally responsible in promoting a sustainable future. (F)
- ARCH 6456 Graduate Studio IV 6 Credit Hours**
Prerequisite: Program admission and 6356. Continues project development of the schematic design. Previously gained awareness, understanding and ability are applied to bring the project to the level of design development. Emphasis is on improving the ability to make value judgments and critically review, test and refine architectural concepts in relation to regional distinctions and sustainable imperatives that reflect current social, economic and cultural demands. (Sp)
- ARCH 6590 Professional Project Research 1-4 Credit Hours**
1 to 4 hours. Prerequisite: permission of instructor. Research and development on subjects related to the professional project in architectural studies, architectural technology, historic preservation, urban design or other approved topics. (F, Sp, Su)
- ARCH 6643 Urban Design Theory 3 Credit Hours**
(Crosslisted with L A 6643 and RCPL 6643) Prerequisite: graduate standing. A survey of theory relevant to the urban design process, including social and behavioral concepts, visual and aesthetic theory, spatial and geographic factors of urban form. (Sp)
- ARCH 6680 Urban Design Studio 1-6 Credit Hours**
1 to 6 hours. Prerequisite: graduate standing. May be repeated with different content; maximum credit six hours. The course involves advanced architectural design projects with an emphasis in architectural studies, architectural technology, historic preservation, urban design, or other approved topics. Laboratory. (F, Sp)
- ARCH 6690 Professional Project 1-6 Credit Hours**
1 to 6 hours. Prerequisite: 5995 or 6680. May be repeated; maximum credit six hours. A terminal professional project demonstrating comprehensive understanding and integrative capabilities in architectural studies, architectural technology, historic preservation, urban design or other approved topics. Laboratory (F, Sp, Su)

**ARCH 6930 Independent Study with Computer Applications 1-6
Credit Hours**

Prerequisite: END 1012 and permission of instructor. Contracted independent study with emphasis on computer applications in architecture. Documentation and presentation varies with nature of the problem or project.

ARCH 6956 Design IX- Comprehensive Architecture I 6 Credit Hours

Prerequisite: Program admission or permission of graduate liaison. This is the first of a two-semester sequence that concludes with ARCH 6056. The course encourages innovative exploration, analysis, speculation, and experimentation in developing schematic proposals. Building design concepts will consider attitudes towards ethical, environmental, site, sustainable, social, financial, material, and historical issues within the built environment and the program's Creating-Making curriculum. (F)

ARCH 6960 Directed Readings 1-3 Credit Hours

1 to 3 hours. Prerequisite: graduate standing or permission of instructor. May be repeated; maximum credit six hours. Directed readings and/or literature review under the direction of a faculty member. (Irreg.)

ARCH 6970 Special Topics/Seminar 1-3 Credit Hours

1 to 3 hours. Prerequisite: graduate standing or permission of instructor. May be repeated; maximum credit 12 hours. Special topics or seminar course for content not currently offered in regularly scheduled courses. May include library and/or research and field projects. (Irreg.)

ARCH 6990 Special Studies in Architecture 1-6 Credit Hours

1 to 6 hours. Prerequisite: graduate standing. May be repeated; maximum credit 12 hours. The candidate will thoroughly explore the particular phase of architecture selected for advanced study by the student and the graduate committee; presentation of the work will be determined by the nature of the contribution. Laboratory (F, Sp, Su)