

# ARCH - ARCHITECTURE

## ARCH 600 Introduction to Architecture and Urban Design

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Introductory seminar and studio on architecture and urban design; focus on topical readings, in-class discussions and short writing exercises; provides opportunity to learn or refine hand drawing, rendering, and model building, and to learn to be productive and creative within the studio context. Must be taken on a satisfactory/unsatisfactory basis. **Prerequisite:** Graduate classification in architecture or approval of instructor.

## ARCH 601 Design Fundamentals I

**Credits 6. 3 Lecture Hours. 9 Lab Hours.** Introduction to the development of verbal (design vocabulary), graphic, research and critical thinking skills through the design of small-scale projects, and investigation of typologies and precedents as the basis for architectural design.

**Prerequisites:** Graduate classification in architecture or approval of instructor; career change program, ARCH 600 and concurrent enrollment in ARCH 610.

## ARCH 602 Design Fundamentals II

**Credits 6. 3 Lecture Hours. 9 Lab Hours.** Further development of verbal, graphic, research and critical thinking skills through architectural design projects, with emphasis on basic understanding of major philosophical doctrines and their influence on architectural theory; studies of place-making, space, form and order; knowledge of world views, formal spatial manipulations and design vocabulary. **Prerequisites:** ARCH 601, ARCH 610, ARCH 612 or approval of instructor.

## ARCH 603 Design Fundamentals III

**Credits 6. 3 Lecture Hours. 9 Lab Hours.** Theory and practice of architecture; methods and techniques used in the analysis and synthesis of concepts unique to spatial enclosure; developing responses to building systems; objects in a current cultural, physical or social context; complex building programs, site development and design solutions integrating formally expressive visual ideas and functional planning. **Prerequisite:** ARCH 602.

## ARCH 605 Architectural Design I

**Credits 6. 2 Lecture Hours. 12 Lab Hours.** Application of verbal, graphic, research, critical thinking and fundamental design skills to architectural projects that emphasize design theory, systems of ordering in architecture and urban design, use of precedents, site and contextual issues; includes program development and concerns for public health, safety and welfare. Core design studio for professional degree candidates. **Prerequisite:** Graduate classification in architecture or approval of instructor.

## ARCH 606 Architectural Design II

**Credits 6. 2 Lecture Hours. 12 Lab Hours.** Application of verbal, graphic, research, critical thinking and fundamental design skills to architectural projects that emphasize the integration of structural, environmental, life safety, building envelope systems, and building service systems; includes code compliance, resource conservation, cost control and economic analysis. Core design studio for professional degree candidates.

**Prerequisite:** ARCH 605.

## ARCH 607 Architectural Design III

**Credits 6. 2 Lecture Hours. 12 Lab Hours.** Application of verbal, graphic, research, critical thinking and comprehensive design skills to advanced architectural projects or design competitions that address cultural traditions, human behavior and diversity, the context of architecture, collaborative skills, ethics and professional judgement. Core design studio. **Prerequisite:** ARCH 606.

## ARCH 608 Architectural Design IV

**Credits 6. 2 Lecture Hours. 12 Lab Hours.** Individually selected design project of major architectural significance and complexity; professional documentation required; project requires approval of instructor.

**Prerequisite:** ARCH 607 or equivalent.

## ARCH 610 Visual Communications

**Credits 3. 2 Lecture Hours. 4 Lab Hours.** Investigation and practice of various communication techniques used to explore, verify and present design decisions in architecture; freehand drawing principles; graphic theory and mechanical drawing techniques; architectural presentation and rendering methods in different media and their application.

**Prerequisite:** Graduate classification or approval of instructor; concurrent enrollment in ARCH 601.

## ARCH 612 Structural and Environmental Technology Concepts

**Credits 3. 3 Lecture Hours.** An introductory course which is intended to quickly and broadly develop the vocabulary base, visual understanding and familiarity with technological systems that architects deal with throughout their practice. **Prerequisites:** Graduate classification or approval of instructor; MATH 142 and PHYS 201 or equivalents.

## ARCH 614 Elements of Architectural Structures

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Investigation of the structural factors that influence the development of architectural space and form; introduction of the physical principles that govern statics and strength of materials through design of timber and steel components of architectural structures. **Prerequisite:** ARCH 612 or approval of instructor.

## ARCH 615 Elements of Environmental Control Systems

**Credits 3. 3 Lecture Hours.** Theory and applications of building energy use, envelope design, shading analysis, heating and cooling systems, lighting design, building water supply plumbing and drainage systems, electrical, acoustical, fire and lightning protection, transportation systems and construction materials; design opportunities, calculations, equipment selection, and component sizing as they relate to design. **Prerequisite:** ARCH 612 or approval of instructor.

## ARCH 619 Applied Solar Energy

**Credits 3. 3 Lecture Hours.** Technology behind applied solar energy design, including: calculating solar radiation, heat transfer related to solar design; active systems; FCHART and economics. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 620 Building Performance Measurement

**Credits 3. 3 Lecture Hours.** Performance measurement strategies for buildings, including: instrumentation and sensors, data collection and data management, weather data requirements, regression or inverse data analysis methods, calibrated whole-building energy simulation, calibrated simplified HVAC system simulation; measurement and analysis of indoor environmental conditions and building water use; baseline strategies; state and federal standards; case studies of commercial building applications. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 621 Energy Optimization in Building Design

**Credits 3. 3 Lecture Hours.** Optimum energy use strategies for commercial buildings, hourly energy simulation methods, building envelope and HVAC system energy optimization by computer simulation techniques; life-cycle cost analysis of building energy systems; case studies in commercial building applications. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 624 Theory of Placemaking

**Credits 3. 3 Lecture Hours.** An introduction to and an exploration of the sources, principles, theories, and physical expressions of the phenomenon of place creation and its relationship to sustainable urbanism; investigates the origin of place theory and its meaning as expressed in the various forms, functions and scales of places applicable to architecture and planning. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 628 Tools for Green Building Design

**Credits 3. 3 Lecture Hours.** Modeling tools and techniques to explore and support sustainable design; develop a deeper understanding of the relationship between architectural design and the environmental forces of sun, wind, and light; design-centered course; helps test the students architectural designs through the use of available modeling tools. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 631 Applied Architectural Structures

**Credits 3. 3 Lecture Hours.** Structural analysis of building structural systems: components, frames, shapes; selection and economics of structural systems; survey of current structural design codes; supervision practices in structural construction. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 633 Applied Architectural Systems

**Credits 3. 3 Lecture Hours.** Building energy consumption patterns and conservation strategies; natural and mechanical subsystems for environmental control; subsystem design criteria, economic considerations and selection methods. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 634 Architectural Lighting

**Credits 3. 3 Lecture Hours.** Attributes of the lighting environment, lighting and energy issues, daylight availability, building design for daylighting, heat loss control, solar shading, daylighting models, graphical analytical and computer methods of analysis, visual and lighting comfort evaluation, integration of daylight and electric light, energy analysis.

## ARCH 637 Seminar in Japanese Architecture History and Theory

**Credits 3. 3 Lecture Hours.** Background and exploration of traditional, modern, and contemporary Japanese architecture, including consideration of region, materials, structure and style, as well as the social and economic factors that include architectural form and contents; discussion of the works and writings and building models of case study of Japanese architects' design. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 638 Architectural Theory--Renaissance Through 19th Century

**Credits 3. 3 Lecture Hours.** Architectural Theory—Renaissance Through 19th Century. Review of architectural theory and practice from the 15th to 19th centuries with emphasis on the classical tradition, its transformations in France and in Great Britain and Germany; aspects of this evolution. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 639 Twentieth Century Architecture: Theory and Practice

**Credits 3. 3 Lecture Hours.** Background and exploration of Modern Architecture, including consideration of region, materials, structure and style, as well as the social and economic factors that influence architectural form and content; discussion of the work and writings of 20th century architects and architectural theorists. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 640 Morphology of Architectural Form

**Credits 3. 3 Lecture Hours.** Forces influencing structure and form of architecture: climate, culture, site, economics, construction methods. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 643 Software Analysis for HVAC Systems in Low Energy Buildings

**Credits 3. 2 Lecture Hours. 3 Lab Hours.** Energy analysis (using Energy Plus software) with an emphasis on developing strategies for low energy use; simulation of various heating and cooling systems in low energy buildings; analysis of the mechanical equipment (including air handling systems, chiller and boilers), the building envelope, energy management control systems and indoor air quality. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 644 Seminar in Art and Architectural History

**Credits 3. 3 Lecture Hours.** Advanced topics in art and architectural history emphasizing methods of analysis and development of theory, including case studies from both western and non-western traditions; topics vary each semester. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 645 Seminar in Architectural Theory

**Credits 3. 3 Other Hours.** Advanced topics in architectural theory emphasizing historical development and relation to practice, including case studies from both western and non-western traditions; topics vary each semester. May be taken three times for credit. **Prerequisites:** Graduate classification or approval of instructor.

## ARCH 646 Historic Preservation Theory and Practice

**Credits 3. 3 Lecture Hours.** History of the preservation movement in the U.S. Architectural and regulatory techniques employed in building preservation; case study of selected examples. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 647 Documentation of Historic Buildings and Sites

**Credits 3. 1 Lecture Hour. 4 Lab Hours.** Advanced techniques for recording historic buildings and sites; measuring and drawing to Historic American Building Survey Standards; field training in photography, laser scanning, photogrammetry, hand measuring, field notes and record drawing preparation. **Prerequisites:** Graduate classification or approval of instructor.

## ARCH 648 Building Preservation Technology

**Credits 3. 3 Lecture Hours.** Preservation technology related to the diagnosis and treatment of defects in buildings; case studies of significant historic structures. Field study may be required for which departmental fees may be assessed to cover costs. **Prerequisite:** ARCH 646 or approval of instructor.

## ARCH 649 Advanced History of Building Technology

**Credits 3. 3 Lecture Hours.** Readings and discussion of current topics in history of building technology; development of understanding the importance of materials of construction to the creation of historical forms of sacred architecture across faith and around the world. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 653 Building Information Modeling in Architecture

**Credits 3. 3 Lecture Hours.** Building Information Modeling (BIM); principles, methods and applications in the building lifecycle with a focus on the design process; includes computer-aided design, parametric modeling, databases, web technologies, design performance simulation and visualization. **Prerequisites:** Graduate classification or approval of instructor.

## ARCH 655 Parametric Modeling in Design

**Credits 3. 3 Lecture Hours.** Parametric modeling principles, methods and applications in environmental design and research; architectural geometry at basic and advanced levels; parametric equations and models; visual programming method; scripting method; constraints, rules and algorithms; elements and patterns of parametric design; parametric simulation; modeling tools. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 657 Advanced Professional Practice and Ethics

**Credits 3. 3 Lecture Hours.** Issues and relationships within the business, legal and political environment; legal forms of practice; office organization, personnel practices, policies and management; expanded services; economics of practice, profit planning and accounting; client selection; standard form agreements with consultants and for specialized services, risk management. **Prerequisites:** Graduate classification or approval of instructor.

## ARCH 658 Building Materials and Assemblies

**Credits 3. 3 Lecture Hours.** Investigation of building materials and their relationship to structure, construction and tectonics in architecture; focus on applicable building codes, standards and cost considerations; understanding of building components and assemblies; roofs, walls, floors and stairs as systems; analysis of traditional and contemporary building technologies; communication of construction ideas through visual tools. **Prerequisites:** Graduate classification in architecture or approval of instructor.

## ARCH 659 Digital Architectural Photography

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Study of equipment, processes and procedures for photography of building exteriors and interiors. **Prerequisites:** Graduate classification or approval of instructor.

## ARCH 660 Design Programming

**Credits 3. 3 Lecture Hours.** Study of successful programming approaches to meet user needs in design projects; history and definition of programming, programming techniques, documentation and case studies; applications to buildings, landscape projects and urban design. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 663 Interior Architecture

**Credits 3. 3 Lecture Hours.** Theory and application of design processes incorporating programming, space planning, analysis and communication of interior requirements for various building types with emphasis on spatial organization, selection of components and materials to satisfy user needs; emphasis on design of the workplace as the synthesis of human factors, organizational theory, systems technology and communication. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 664 Urban Design for Architects

**Credits 3. 3 Lecture Hours.** Investigation of the creative role in architectural ideas in the design process and their manifestation in successful urban design; identification and evaluation of urban design examples that are at the leading edge of architectural practice and anticipate the future; consideration of neighboring, local, regional levels, social and economic factors that influence urban form and fabric; discussion of the works and writings and the case study of livable urban design. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 668 Preservation Field Studies

**Credits 1 to 6. 1 to 6 Other Hours.** Fieldwork related to practice of historic preservation and cultural heritage management; advanced methods of documentation, analysis, planning, and treatment; emphasis on identification and evaluation of multidisciplinary approaches to historic preservation and heritage conservation in global contexts; topics vary each semester. May be taken for credit up to six hours. **Prerequisites:** Graduate classification or approval of instructor.

## ARCH 669 Foundations of Research in Architecture

**Credits 3. 3 Lecture Hours.** Introduction to the research process and its application to problems in architecture; survey of current literature on research design methods relevant to diverse architectural problems; qualitative and quantitative research strategies and techniques; communicating research results. May be taken two times for credit. **Prerequisites:** Graduate classification; concurrent enrollment in ARCH 681 and ARCH 690.

## ARCH 673 Design for Active Living

**Credits 3. 3 Lecture Hours.** Understanding the forms and characteristics of the built environment and the influence on human behaviors, lifestyles and health; theoretical and empirical insights into the issues of physical activity, obesity and automobile dependency; focus on how changes in the built environment help address these issues. **Prerequisite:** Graduate classification or approval of instructor. **Cross Listing:** LAND 632 and PLAN 632.

## ARCH 674 Typologies of Contemporary Hospital Design

**Credits 3. 3 Lecture Hours.** Introduction to the contemporary planning of hospitals; comparisons of hospital design by contemporary practitioners; best practice models, repetitive patterns, and innovative designs. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 675 Health Design and Research

**Credits 3. 3 Lecture Hours.** Examination of health environments to include buildings, healthcare gardens and restorative landscapes, and urban design for home-based care and independent living; emphasis on research-informed approaches for patient-centered design that reduce stress and promote improved health outcomes. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 676 Survey of Human Behavior and Design

**Credits 3. 3 Lecture Hours.** Examination of human behavior and attitudes that influence spatial decision making; includes sections on environment and behavior, real estate finance, urban design decision making. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 677 Neuroscience and Architecture

**Credits 3. 3 Lecture Hours.** Advanced introduction to the field of experimental psychophysiology with applications taken primarily from the field of environmental psychology and supplementing with examples from the fields of social and cognitive neuroscience; exposure to the foundations, principles and selected applications of neuroscience. **Prerequisite:** Approval of instructor.

## ARCH 678 Foundations of Healthcare Design

**Credits 3. 3 Lecture Hours.** Introduction to the theory of healthcare design over the course of time; exploration of the relationship of the medicine, science, art, and culture of each period with the design of buildings and environments for healthcare; emphasis on historic periods and the contemporary. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 681 Seminar

**Credits 1 to 3. 1 to 3 Other Hours.** Discussion and review of current practice in architecture and environmental design. **Prerequisite:** Graduate classification or approval of instructor.

## ARCH 684 Professional Internship

**Credits 1 to 8. 1 to 8 Other Hours.** Professional practice under approved arrangement with public or private agencies or in residence to complement academic coursework and to provide the basis for, and allow the preparation of, an appropriate report. **Prerequisite:** Graduate classification or approval of instructor and department head.

## ARCH 685 Directed Studies

**Credits 1 to 6. 1 to 6 Other Hours.** Individual problems involving application of theory and practice in design and construction of buildings and groups of buildings. **Prerequisite:** Graduate classification or approval of instructor and department head.

## ARCH 689 Special Topics in...

**Credits 1 to 6. 1 to 6 Lecture Hours. 0 to 4 Lab Hours.** Selected topics in an identified field of architecture. May be repeated for credit. **Prerequisite:** Graduate classification or approval of instructor or department head.

## ARCH 690 Research Ideologies for Architecture

**Credits 3. 3 Lecture Hours.** Design of research in architecture; evaluation of research methodologies from current research literature. **Prerequisite:** Graduate classification or approval of instructor and department head.

## ARCH 691 Research

**Credits 1 to 23. 1 to 23 Other Hours.** Research for and preparation of dissertation. **Prerequisite:** Graduate classification or approval of instructor and department head.

## ARCH 693 Professional Study

**Credits 1 to 23. 1 to 23 Other Hours.** Application of verbal, graphic, research and critical thinking skills to an approved, individually selected architectural issue or design project that will advance the broad understanding of architecture and its impact on people. The terminal requirement for the Master of Architecture degree. May be taken more than once but not more than 6 hours used toward a degree. **Prerequisites:** ARCH 605, ARCH 606, ARCH 607; proposal approval.