

ARCHITECTURE (ARCH)

ARCH 100

Introduction to Architecture

Orientation to contemporary local architecture practice in the context of the history of architectural theory; examination of the changing role of the architect through history; introduction to the formal language and vocabulary of the discipline. Emphasis given to developing written and presentations skills.

Lecture: 2 **Lab:** 3 **Credits:** 3

Satisfies: Communications (C)

ARCH 107

Design Communication I: Introduction

This course introduces students to a wide range of fundamental representational techniques, tools, and methodologies that are part of an architect's essential skill set. A series of exercises will develop essential creative skills in analog and digital drawing while simultaneously exposing drawing as a device through which we are able to see, understand, create, and communicate with the world around us.

Lecture: 1 **Lab:** 2 **Credits:** 3

ARCH 108

Design Communication II: Advanced

This course introduces students to a wide range of digital and computational techniques, tools, and methodologies that are part of an architect's essential skill set. A series of exercises will develop and advance the student's knowledge of 3D modeling and representational methods while gaining a necessary understanding of how each tool can be utilized to analyze and communicate architectural ideas.

Prerequisite(s): ARCH 107

Lecture: 1 **Lab:** 2 **Credits:** 3

ARCH 113

Architecture Studio I: Elements

Introduction of architecture through the design of architectonic elements – walls, doors, stairs, rooms, etc. Students explore the relationship between the human body and the built environment and learn fundamentals of composition, design process, representation, research, craftsmanship, graphic and verbal communication, and analytical thinking.

Lecture: 0 **Lab:** 12 **Credits:** 6

Satisfies: Communications (C)

ARCH 114

Architecture Studio II: Unit

As an extension of the themes of ARCH 113, students explore the synthesis of architectural elements in the design of an integrated architectonic unit comprised of architectural elements. Students are introduced to urban research and further develop their skills of analytical thinking, representation, and design communication.

Prerequisite(s): ARCH 107 and ARCH 113 and ARCH 108*, An asterisk (*) designates a course which may be taken concurrently.

Lecture: 0 **Lab:** 12 **Credits:** 6

Satisfies: Communications (C)

ARCH 201

Architecture Studio III: House

Continued development of architectural principles of ARCH 114 through the design of a house in the city and the study of dwelling precedents. Students are introduced to the concepts of programming, urban design, and the technical aspects of construction assemblies and further develop their understanding of design process and their skills in design communication and critical thinking.

Prerequisite(s): ARCH 113 and ARCH 108 and ARCH 114

Lecture: 0 **Lab:** 12 **Credits:** 6

ARCH 202

Architecture Studio IV: Multiple

Continued development of architectural principles of ARCH 201 through research and design of multi-unit housing in the city. Students further their understanding of programming, urban design and the technical aspects of construction assemblies. The study of architectural scale, composition and urban relationships are explored. Development of design process and skills of design communication and critical thinking are furthered.

Prerequisite(s): ARCH 113 and ARCH 201 and ARCH 114

Lecture: 0 **Lab:** 12 **Credits:** 6

ARCH 207

Design Communications III: Analysis and Exposure

Introduction to geospatial mapping, data modeling, and data visualization processes for research, analytics, and generative design. Basic data structures, algorithms, and design patterns advance students ability to construct digital tools and communicate complexity.

Prerequisite(s): ARCH 108 and ARCH 107

Lecture: 1 **Lab:** 2 **Credits:** 3

ARCH 215

Site Design, Planning, and Ecology

Introduction to the fundamentals of site design and the analysis of topography, soils, climate, solar, wind, thermodynamics, water management, trees/vegetation, and accessibility as environmental design factors. Course format includes lectures, site visits, and workshops to develop a better understanding of the complex relationship between building and landscape.

Prerequisite(s): ARCH 107 and ARCH 114 and ARCH 113 and ARCH 108

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 230**Systems: Structural Analysis**

The course will provide the student with an understanding of basic structural behavior. It will teach students about forces, vectors, equilibrium, statics, free body diagrams, material properties, stress, strain and deformation. It will look at the concepts of loads taken down and tributary area. Part of that discussion will be the concept of diaphragms (flexible vs. rigid) as a way of distributing horizontal loads to the lateral resisting systems.

Prerequisite(s): PHYS 200 or PHYS 123 or (PHYS 211 and PHYS 212)

Lecture: 3 Lab: 0 Credits: 3

Satisfies: Natural Science (N)

ARCH 305**Architecture Studio V: Hybrid**

Continued development of architectural principles of ARCH 202 through research and design of a project of hybrid program in the city. Students further their understanding of programming, urban design and the technical aspects of construction assemblies. The study of architectural and urban space, site and context, building composition and urban relationships are explored. Development of design process and skills of design communication and critical thinking are furthered.

Prerequisite(s): ARCH 201 and ARCH 230 and ARCH 202

Lecture: 0 Lab: 12 Credits: 6

ARCH 306**Architecture Studio VI: Hybrid**

Continued development of architectural principles of ARCH 305 through the design of an urban neighborhood project. Students are introduced to urban design and larger scale planning issues and conduct broad-based research into issues impacting larger mixed-use buildings in the city.

Prerequisite(s): ARCH 201 and ARCH 230 and ARCH 305 and ARCH 202

Lecture: 0 Lab: 12 Credits: 6

ARCH 321**Contemporary Architecture**

This course investigates the state of contemporary architecture as represented by significant practices, buildings, theories, and criticisms. Themes to be considered include globalization, the role of digital design media, the ethics and aesthetics of sustainability, contemporary urbanism, new approaches to materials and structure, and recent interests in ornament and pattern-making. Current conditions will be related historically to postwar reactions to modernism and contextually to the social and technological shifts of recent decades.

Prerequisite(s): AAH 120 and AAH 119

Lecture: 3 Lab: 0 Credits: 3

Satisfies: Communications (C)

ARCH 331**Visual Training I**

Aesthetic expression as experience. Exercises in the study of form: proportion and rhythm, texture and color, mass and space. Exercises in visual perception and aesthetic judgment. Isolation and analysis; interdependence and integration of sensuous qualities. Aesthetic unity under restrictive conditions.

Lecture: 3 Lab: 0 Credits: 3

ARCH 332**Visual Training II**

Aesthetic expression as experience. Exercises in the study of form: proportion and rhythm, texture and color, mass and space. Exercises in visual perception and aesthetic judgment. Isolation and analysis; interdependence and integration of sensuous qualities. Aesthetic unity under restrictive conditions.

Prerequisite(s): ARCH 331

Lecture: 3 Lab: 0 Credits: 3

ARCH 333**Visual Training III**

Spatial studies with planes and volumes of various materials. Aesthetic expression as experience. Exercises in the study of form: proportion and rhythm, texture and color, mass and space. Exercises in visual perception and aesthetic judgment. Isolation and analysis; interdependence and integration of sensuous qualities. Aesthetic unity under restrictive conditions.

Prerequisite(s): ARCH 332 and ARCH 331

Lecture: 3 Lab: 0 Credits: 3

ARCH 334**Material: Metal**

A comprehensive investigation of steel building design viewed through material properties, structural members, and structural systems. The focus of the class will be the understanding and reduction of complex steel building concepts into understandable components of the detail, the element, and the system. Topics include flexural members, compression members, tension members, lateral and gravity systems, and connections. Current and historical precedents will be presented in case studies and building tours.

Prerequisite(s): ARCH 230 and (PHYS 123 or PHYS 200)

Lecture: 3 Lab: 0 Credits: 3

Satisfies: Natural Science (N)

ARCH 335**Material: Cementitious**

A comprehensive investigation of concrete building design viewed through material properties, structural members, and structural systems. The focus of the class is the understanding and reduction of complex concrete building concepts into understandable components of the detail, the element and the system. Topics include flexural members, compression members, geotechnical engineering, foundation systems, lateral and gravity systems, connections, and detailed technical drawings. Current and historical precedents will be presented in case studies and building tours.

Prerequisite(s): ARCH 230 and ARCH 334 and (PHYS 123 or PHYS 200)

Lecture: 3 Lab: 0 Credits: 3

Satisfies: Natural Science (N)

ARCH 403**Environment and Building Systems I**

Selection and design of building support systems: heating, ventilating, air conditioning, water supply, sanitary and storm drainage, power distribution, lighting, communications and vertical transportation. Systems are analyzed for their effect on building form, construction cost and operating efficiency.

Prerequisite(s): (ARCH 201 and ARCH 202) or Graduate standing

Lecture: 3 Lab: 0 Credits: 3

ARCH 404**Environment and Building Systems II**

Selection and design of building support systems: heating, ventilating, air conditioning, water supply, sanitary and storm drainage, power distribution, lighting, communications, and vertical transportation. Systems are analyzed for their effect on building form, construction cost and operating efficiency.

Prerequisite(s): ARCH 403

Lecture: 3 Lab: 0 Credits: 3

ARCH 413**Architectural Practice**

Lectures and practical problems dealing with specifications, specification writing, administration of construction, contracts, building law and professional practice.

Lecture: 3 Lab: 0 Credits: 3

ARCH 414**Professional Practice: Building Case Studies**

Case study analysis of buildings, including the design process, building detailing, construction methods, government regulation, owner satisfaction, and post-construction forensics.

Lecture: 3 Lab: 0 Credits: 3

Satisfies: Communications (C)

ARCH 417**Architecture Studio VII: Synthesis**

This course introduces students to technical aspects of building design through a Comprehensive Building Design project focusing on an institutional building in the city. Building on previous design studios, students continue their investigation into urban and cultural research, and are introduced to building systems and concepts of building performance, sustainability and building envelope design. The integration of mechanical, electrical, plumbing systems, structural systems, constructional assemblies, and technology systems is addressed in lectures and studio work, and students are introduced to advanced tools related to building performance and evaluation software.

Prerequisite(s): (ARCH 230 and ARCH 404 and ARCH 403 and ARCH 335 and ARCH 334 and ARCH 306) or Graduate standing

Lecture: 0 Lab: 12 Credits: 6

ARCH 418**Architecture Studio VIII: Synthesis**

This course continues and furthers the student's understanding of the technical aspects of building design through a Comprehensive Building Design project focusing on an institutional building in the city with a complex program. Building on previous design studios, students continue their investigation into urban, programmatic and cultural research, and further their knowledge of building systems and concepts of building performance, sustainability and building envelope design. The integration of mechanical, electrical, plumbing systems, structural systems, constructional assemblies, and technology systems is addressed in lectures and studio work, and students further their understanding of advanced tools related to building performance and evaluation software.

Prerequisite(s): (ARCH 230 and ARCH 334 and ARCH 404 and ARCH 403 and ARCH 417 and ARCH 335) or Graduate standing

Lecture: 0 Lab: 12 Credits: 6

ARCH 419**Architecture Studio IX: Advanced**

Advanced Studios engage both IIT architecture faculty and a select group of visiting studio professors noted for their outstanding professional experience in contemporary practice. The focus of each studio is strong design experimentation that is implemented in highly resolved, complex architectural design projects. Studios work on sites within Chicago, explore urban areas around the globe, and/or focus on hypothetical or technological challenges that shape the built environment. Students design structural and material systems that recognize issues of ecology as well as the broader, integrated concerns of climate, energy and natural resource use, and sustainability. Uniting the diverse strands of urban place making, economic diversity, social equity and environmental stewardship, Advanced Studios promote the design of places that reflect the values of their inhabitants, and create a lasting sense of community with meaningful identity. The studios are formed in thematic clusters that complement each other or serve as dialectical opposites. Each studio explores a variety of techniques from parametric design, digital fabrication, model making, and advanced geospatial software to cultural and theoretical explorations. Students will be able to select from a variety of studio topics. The vertical studio integrates advanced BArch, MArch, MS, and PHD students. Open only to Architecture majors.

Prerequisite(s): ARCH 230 and ARCH 335 and ARCH 334 and ARCH 417 and ARCH 418 and ARCH 403 and ARCH 404

Lecture: 0 Lab: 12 Credits: 6

ARCH 420**Architecture Studio X: Advanced**

Advanced Studios engage both IIT architecture faculty and a select group of visiting studio professors noted for their outstanding professional experience in contemporary practice. The focus of each studio is strong design experimentation that is implemented in highly resolved, complex architectural design projects. Studios work on sites within Chicago, explore urban areas around the globe, and/or focus on hypothetical or technological challenges that shape the built environment. Students design structural and material systems that recognize issues of ecology as well as the broader, integrated concerns of climate, energy and natural resource use, and sustainability. Uniting the diverse strands of urban place making, economic diversity, social equity and environmental stewardship, Advanced Studios promote the design of places that reflect the values of their inhabitants, and create a lasting sense of community with meaningful identity. The studios are formed in thematic clusters that complement each other or serve as dialectical opposites. Each studio explores a variety of techniques from parametric design, digital fabrication, model making, and advanced geospatial software to cultural and theoretical explorations. Students will be able to select from a variety of studio topics. The vertical studio integrates advanced BArch, MArch, MS, and PHD students. Open only to Architecture majors.

Prerequisite(s): ARCH 230 and ARCH 334 and ARCH 335 and ARCH 417 and ARCH 418 and ARCH 403 and ARCH 404

Lecture: 0 Lab: 12 Credits: 6

ARCH 421**Basics of Building Simulation in the Built Environment I**

This course aims to provide students with an understanding of principles, methods and applications of energy and carbon analysis at both building and urban scales, through weekly lectures and hands-on simulation software tutorials.

Prerequisite(s): ARCH 335 or ARCH 514 with min. grade of C

Lecture: 3 Lab: 0 Credits: 3

ARCH 422**Basics of Building Simulation in the Built Environment II**

The application of energy conservation methods and renewable energy sources, such as wind power and passive solar systems, will be examined in the development of building energy budgets for a variety of building types.

Prerequisite(s): ARCH 421

Lecture: 3 Lab: 0 Credits: 3

ARCH 423**Architectural Programming**

Study of the principles of problem definition, problem solving, and decision making in the process of design. Specific research methods are reviewed, including those with computer-aided data collection potential. Coursework includes: identification of client/project requirements and constraints; development of a building/project program; cost analysis; development of relevant design options; and presentation skills and development.

Lecture: 3 Lab: 0 Credits: 3

Satisfies: Communications (C)

ARCH 431**Visual Training I**

Aesthetic expression as experience. Exercises in the study of form: proportion and rhythm, texture and color, mass and space. Exercises in visual perception and aesthetic judgment. Isolation and analysis; interdependence and integration of sensuous qualities. Aesthetic unity under restrictive conditions.

Lecture: 1 Lab: 2 Credits: 3

ARCH 432**Visual Training II**

Aesthetic expression as experience. Exercises in the study of form: proportion and rhythm, texture and color, mass and space. Exercises in visual perception and aesthetic judgment. Isolation and analysis; interdependence and integration of sensuous qualities. Aesthetic unity under restrictive conditions.

Prerequisite(s): ARCH 431

Lecture: 1 Lab: 2 Credits: 3

ARCH 433**Introduction to Digital Fabrication**

This course offers a comprehensive exploration of computer-aided fabrication from concept development and modeling through digital file creation and cutting processes. Using CAD/CAM software, laser cutters, CNC mills, and 3D printers, students with a variety of interests can build the elements of detailed models, fabricate a range of finished objects, or even create landscapes incorporating highly articulated surfaces. The course stresses the integration of the complete thought process from concept development to pre-visualization to detailed modeling to fabrication setup and finishing. Students gain a solid understanding of the rapidly developing world of CAD/CAM techniques while acquiring specific long-term skills in software-based modeling and machine-assisted fabrication.

Prerequisite(s): ARCH 108 or ARCH 508 with min. grade of C

Lecture: 1 Lab: 2 Credits: 3

ARCH 434**Advanced Building Information Modeling Strategies**

Students work on research topics related to the intersection of machine learning, artificial intelligence, and building information modeling. We are exploring topics related to neural networks, natural language processing and other advanced computer science topics. The course attempts to ask the question of what should architects and designers be doing with the wealth of data that is defined during the design and construction process.

Prerequisite(s): ARCH 108 or ARCH 508

Lecture: 0 Lab: 3 Credits: 3

ARCH 435**Digital Fabrication**

This course explores the design and fabrication of components in contemporary practice. The class will investigate through the design and prototyping of a custom component. Survey of CAD/CAM/GIS use in practice and component manufacturing including modeling, simulation, and scripting. Behavioral models of components using simulation and analysis tools (flow, system dynamics, etc.). Use of CAD tools to model components for production (modeling for CNC considering toolpaths and jigs). Use of CAD tools to analyze properties of components. Material properties and related fabrication constraints. Current fabrication processes. Use of IIT-owned CNC tools to fabricate components. Rapid prototyping.

Prerequisite(s): ARCH 433

Lecture: 1 Lab: 2 Credits: 3

ARCH 436**Advanced Modeling**

This course will focus on 3D modeling of complex geometric components in architecture and design. Concepts explored will concentrate on the advancement of digital design as an iterative process. Various modeling types covered are (1) Explicit Modeling, (2) Nurbs Surface Modeling, (3) Parametric Modeling, and (4) Generative Components and Response Modeling. Output will utilize digital fabrication methods as support of the iterative design process.

Prerequisite(s): ARCH 108 or ARCH 508

Lecture: 0 Lab: 3 Credits: 3

ARCH 437**BIM Revit**

This course is designed to teach students the fundamentals of Autodesk's Revit software. The course includes an in-depth tour of the user interface and basic creation, editing, and viewing tools. In addition, the course will provide instruction on a variety of design development tools including walls, floors, roofs, windows, curtain-wall systems, stairs and more. Finally, instruction will be providing on the use of Autodesk's cloud-based services for the creation of computer-generated renderings and panoramic images.

Prerequisite(s): ARCH 108 or ARCH 508

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 438**Design Visualization**

This course is an in-depth exploration of new visualization techniques to support and express architectural design through 3D rendering. Topics covered will include 3D modeling, cameras, lighting, material mapping, and rendering output. Presentation concepts covered include storytelling, rendering style, visual mood, and image composition.

Prerequisite(s): ARCH 108 or ARCH 508

Lecture: 1 **Lab:** 3 **Credits:** 3

ARCH 440**Pure Form**

The concept of pure form resides in the abstract in their ideal state the forms are perfect. Material properties inherently defy perfection and force a set of priorities and decisions that render the proximity of an ideal while providing a sensual experience. The study of the relationship between ideas, form and physical making integral to the production process, through repetition and variation. Production of a cohesive body of investigative work of a single pure form.

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 441**Collage Making**

Collage, the act of bringing together disparate materials and imagery, has the opportunity to explore unknowns, exploit the peculiar, and reveal the uncanny. Collage operates within a contemporary context of mass-production, mass media, and mass consumption. Mash ups, cut ups, power mixing, and sampling are artistic methods of repurposing products made by others. Collage Making explores the iterative process of collection/selection/arrangement and execution. Collages produced will examine architecture in contemporary culture.

Prerequisite(s): ARCH 107 or ARCH 506 with min. grade of C

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 445**The Prairie School**

This significant Midwestern style of architectural and landscape design evolved from social reform and nationalist tendencies but also from the beginnings of ecology and modern design. This course focuses on the work of Prairie School architects and landscape architects such as Frank Lloyd Wright, Walter Burley Griffin, Jens Jensen, and IIT's Alfred Caldwell. Field trips explore the evolution of 19th century Romantic Styles into Prairie School designs, ending with 20th century modernism and organic architecture. The collaboration between planners, architects, landscape architects, and craftspeople will be explored throughout the course.

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 446**History of Landscape Architecture**

Survey of the history of landscape design throughout the world, including contemporary projects. The course emphasizes both analytical and holistic approaches to the study of historic designs, highlights the relationship between architecture and landscape, and stresses major concepts that directly influence present day designs. One field trip.

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 447**Architecture and Furniture**

Individually or in small groups, students will design and fabricate furniture as part of a collectively developed master plan. Students explore historic and contemporary furniture design, theory, materials, and fabrication techniques. Lectures and discussions will focus on the relationship between architecture and furniture in its 500-year history, the design process, fabrication technologies and techniques, drawing and modeling as a means of exploration, representation, presentation, and fabrication. Labs will allow students the opportunity to experience in a semester the traditional sequence of master plan, schematic design, design development, construction drawings, fabrication, and use.

Lecture: 1 **Lab:** 2 **Credits:** 3

ARCH 448**Topics in Furniture Design/Build**

This topics course will introduce students to the use of traditional furniture building techniques including the use of hand and power tools. Students will investigate furniture built of solid wood, composite wood, plastics, and metals and learn to build furniture with a limited number of basic tools and on a budget. A series of exercises will train students to do the physical connection; a series of lectures and presentations will show production and finishing techniques.

Lecture: 1 **Lab:** 2 **Credits:** 3

ARCH 449**Alternative Chairs**

This course will be about the design of chairs, or more broadly body support devices, and the focus will be on ergonomics, structure, materials, and manufacturing issues. If a house can be considered a "machine for living", this will be about machines for the support of the body. The course will conclude with each student building a prototype chair of his or her own design.

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 454**Contemporary Chicago Architecture: Case Studies**

Contemporary architecture and urban design projects in Chicago present an invaluable opportunity to learn about some of the most advanced applications in practice today. By examining significant projects currently underway, this course will investigate project execution, design concepts and the various forces affecting projects' definition and results. Close scrutiny of all the components and personnel will give a better understanding of the complex synergies, advanced technologies, and adept project teams necessary for successful innovative architecture and urban planning.

Lecture: 3 Lab: 0 Credits: 3

ARCH 456**Topics in Modernism**

This class is devoted to the close observation, description, and analysis of works of architecture from 1900 to the present. We will read exemplary texts of architectural criticism and history. Conducted as a seminar, this course studies writings and buildings through research papers, presentations, and other projects.

Lecture: 3 Lab: 0 Credits: 3

ARCH 460**Integrated Building Delivery Practice/BIM**

Architecture has always been a complex interdisciplinary business, where the management of allied professions and industry affiliates is critical to the success of any endeavor of significant scale. The introduction of BIM (Building Information Modeling) is an advance in project delivery tools which should be viewed as a multi-dimensional expansion of the mechanisms of management and accommodation of an ever-broadening range of participants in the organization of a project, allowing the development of a new delivery protocol, IBPD (Integrated Building Project Delivery). BIM is currently recognized as consolidating the basis for a range of functions including drawing, modeling, document management, clash detection, interdisciplinary coordination, estimating, scheduling, constructability review, production modularization, fabrication protocols, and for the analysis of myriad physical and prescriptive demands such as energy consumption, daylighting, code compliance, egress, circulation, and operation scenarios. The breadth of information embedded in a BIM model will require the emergence of facilitating professionals to an extent previously unknown in the practice and the industry. This course explores the state of the profession and the anticipated ramifications. Undergraduate students must be in their fifth year of study.

Lecture: 3 Lab: 0 Credits: 3

ARCH 461**Entrepreneurship and Innovation in Architecture**

The course teaches future architects the practical aspects of entrepreneurial small business management, to develop a comprehensive opportunity assessment, and to develop the skills necessary to improve the odds of success. The course will consider strategies to leverage limited resources for maximum effect. The course will also cover small organization and group behavior, performance, leadership, and motivation in small business settings and will focus on the owner/manager as the principal success factor in the context of a small organization. Emphasis is placed on the circumstances and opportunities of the professional practice of architecture: practice as profession, process, organization, business, and evolving models of practice are covered. The course also provides a series of concepts, frameworks, and heuristics that enable the entrepreneur to anticipate and deal with the challenges that accompany growth of an existing business. Cases, exercises, lectures, and speakers are used to focus on choosing opportunities, allocating resources, motivating employees, and maintaining control while not stifling innovation. A key component of the course is how to sustain entrepreneurial thinking in mid-sized ventures as they continue to grow. Undergraduate students must be in their fifth year of study.

Lecture: 3 Lab: 0 Credits: 3

ARCH 462**Planning Law and Land Policy**

Since the introduction of basic zoning laws to the numbers and complexity of ordinances attached to any land parcel have proliferated to include those addressing land use, development, density, environmental concerns both on and off site, aesthetic mandates, energy use, quality of life concerns, and infrastructure development, the growing understanding that comprehensive and integrated systems must be managed across property lines to effect sustainable planning and communities will accelerate the number of prescriptive and policy ordinances enforced at the development of a parcel. Many agencies have further created extra-legal linkages between approvals for land development and the provision of social and ideological benefits to the community. The impact on the profession of architecture of the panoply of planning options and governmental goals is the result that the navigation of the system of mandated design determinates is one of the initial and potentially most creative acts in the process of project delivery. Project designers must understand the ramifications and trade-offs inherent in the system, especially in any attempt to achieve the best use of any parcel of land and position the most appropriate built environment. Undergraduate students must be in their fifth year of study.

Lecture: 3 Lab: 0 Credits: 3

ARCH 463**Real Estate Development and Finance Fundamentals**

The Art of the Deal, with the emphasis on Art, is a term best positioning the financial structuring behind any project. The ability of the project team leader in integrated practice to understand and appreciate the motivations and opportunities inherent in the initiation of the project will be essential in guiding team decisions and maintaining a leadership position. The understanding of the financial underpinnings of a project is of paramount importance to those intending to actually engage the process of initiating and effecting a construction activity. The sources, costs, and sequence of funding, budgeting, cash flow, incentives options, and tax ramifications regarding a project are to be addressed as component knowledge to an understanding of integrated project management. Undergraduate students must be in their fifth year of study.

Lecture: 3 Lab: 0 Credits: 3

ARCH 465**Construction and Project Management**

The organization of deliverables from the multiple participants in a project plan, including estimating, quality control, value engineering, scheduling of work, conflict resolution, pay schedules, and project close-out and commissioning are essential to managing a building project. Many of these areas of endeavor are those most directly impacted by the developments addressed in Integrated Building Delivery Practice. This course will solidify the underpinnings and will amplify, where needed, the requisite understanding in these areas of the practice. The development of managerial skills requisite to the practice of this coordination and the basis of developing inter-professional relationships will be stressed throughout the incorporation of the technical methodologies.

Lecture: 3 Lab: 0 Credits: 3

ARCH 466**Entrepreneurial Design: Sector Studies/Case Studies**

This course will be advanced as an independent study format. Each student will work independently to research a project option, or building type, and document the particular attributes of that case study which require specialized address. Case studies might be a particular business niche such as land sub-divisions, condo conversions, change of use conversions, or build-to-suit options. The studies might pursue particular building types, social initiatives, historic restoration strategies, or even unique construction typologies. Undergraduate students must be in their fifth year of study.

Lecture: 3 Lab: 0 Credits: 3

ARCH 467**Advanced Materials Workshop**

This course is designed to involve students with the architectural craft of materials that can be applied to model and prototype construction. Included will be a product project of the student's own choosing.

Lecture: 1 Lab: 2 Credits: 3

ARCH 468**Topics in Drawing From Travel**

A drawing topics course that develops the perceptual and technical skills critical to drawing in the field. Particular emphasis will be placed on the freehand travel sketch and its capacity to evoke both the physicality and character of a place. Production of a comprehensive drawn record of travels in the form of a journal/sketchbook is required. Various media will be explored.

Lecture: 0 Lab: 6 Credits: 3

ARCH 470**Image City: Mediation of Space**

This seminar surveys the interaction between media and the city from the 19th century to the present. Any consideration of contemporary urban issues must take into account the roles that media and information technologies play in our lives. Every space we encounter or create has to be considered mediated. Course work will include assigned readings, assigned screenings, and creative design problems related to the issues considered in class.

Lecture: 3 Lab: 0 Credits: 3

ARCH 471**Architectural Freehand Rendering**

Utilizing site visits, lectures, presentations, and critiques, students will learn freehand sketching, perspective, and conceptual sketching to convey building spatial ideas. Conceptual and schematic analysis of site visits will teach students to represent existing spaces, environments, and buildings as well as various building materials. Students will rely on four media to quicken their drawing skills and visual analysis – pencil, ink, pastel, and water color.

Lecture: 3 Lab: 0 Credits: 3

ARCH 473**Conflict and Time**

This seminar employs comparative studies of other arts, in particular cinema, to illuminate architectural aesthetics and the creative process. It has a dual focus: it undertakes an introduction to film studies through the analysis of films and readings in film theory and aesthetics; at the same time, it will consider architectural concepts and artifacts. The aim is not primarily to study cinema nor to make a definitive conclusion about the congruence or divergence of architecture and cinema. The course intends to cultivate a way of seeing: to illuminate the relations between media, technology, geography, architecture, and ideology.

Prerequisite(s): ARCH 108 or ARCH 508 with min. grade of C

Lecture: 3 Lab: 0 Credits: 3

ARCH 475**Spatial Stories**

This course will examine the spatial story as it appears in diverse media: short fiction, films, everyday discourse, architecture, etc. The coursework will consist of reading and writing assignments as well as the viewing of films and other visual artifacts. The course has two goals: to offer students the opportunity to improve their study and communication skills and to examine the social, cultural, and historical aspects of spatial practices such as architecture.

Lecture: 3 Lab: 0 Credits: 3

ARCH 478**Digital Photography**

Equips students with a suite of photographic skills and strategies tailored to their work as architects. Cultivates a discursive practice by developing foundational technical competencies, building awareness of key precedents, and honing a critical perspective for reading photographic images. Topics covered include camera operation, composing, staging, lighting, post-processing, printing, editing, curating, and publishing. Field and studio assignments, case study research work, and conversations with practicing photographers.

Lecture: 3 Lab: 0 Credits: 3

ARCH 480**Materials and Construction**

This course provides an overview of basic building materials and assemblies, how they are constructed, and the relationships between them. The objective is to introduce students to the range of material choices available to the designer, new materials and assemblies, and fundamental principles to guide design decisions. The course is organized according to the MasterFormat outline developed by the Construction Specifications Institute. Students will learn standards for writing specifications using a system of numbered categories to organize construction activities, products, and requirements into a standard order. Topics include pre-design issues, sites and foundations, concrete, masonry, metals, wood, plastics, thermal and moisture protection, glass, roofing systems, and conveying equipment.

Lecture: 3 Lab: 0 Credits: 3

ARCH 481**Materiality in Architecture**

This course examines the topic of material culture in contemporary architecture, and explores the different approaches, ideas and philosophies associated with aspects of materiality in architecture through the investigation and discussion of case study projects by contemporary architects. Students are introduced to a variety of approaches to the topic since the dawn of the Modern Movement, and explore how different contemporary architects approach the idea of materiality in their work, through their words, thoughts and built work. Thematic topics related to materiality are also presented and discussed, including materiality and landscape, materiality and technology, and materiality and memory. The class format is a lecture presentation by the professor with student discussion. The course is an elective section of the History/Theory sequence.

Lecture: 3 Lab: 0 Credits: 3

ARCH 482**Material: Fibrous**

A laboratory and experimental-based class investigation of anisotropic fibrous materials as a building component viewed through historical timber design precedents. Topics include low and high-rise framed construction, cross-laminated timber, CNC fabrication methods composite construction, tensile systems, and wood and paper-based products. Structural analysis will explore material properties and connections of a directionally grained and fibrous medium.

Prerequisite(s): (ARCH 230 and ARCH 334 and ARCH 335) or (ARCH 485 and ARCH 486)

Lecture: 3 Lab: 0 Credits: 3

ARCH 483**Material: Transparent**

An exploration of historical and current technology through the work of artists, architects, craftsmen, and engineers in a brittle medium. Topics include wall systems, connections, structural design of all glass structures, and material properties. Sealants, coatings, adhesives, and impact and blast resistant interlayers will also be covered. A lab component will encourage experimentation of columns, beams, and surfaces from glass components.

Prerequisite(s): (ARCH 230 and ARCH 334 and ARCH 335) or (ARCH 485 and ARCH 486)

Lecture: 1 Lab: 2 Credits: 3

ARCH 485**Structures I: Structural Analysis -- The System**

Basic understanding of the system involves forces, vectors, equilibrium, statics, supports with free body diagrams, material properties, stress, strain, and deformation (force or temperature). Simple structural systems will be analyzed using simple statics and free body diagrams. The latter part of the course will concentrate on structural typologies. Load paths will be analyzed for several different types, construction materials, and structural systems. Principles of deflection will be presented along with vertical and lateral displacement issues.

Lecture: 3 Lab: 0 Credits: 3

ARCH 486**Structures II: Building Design**

A comprehensive investigation of building design viewed through the mechanics of elemental forces. The focus of the class will be the understanding and reduction of complex building concepts into understandable components of the detail, the element, and the system. Topics include lateral resisting components, diaphragms, moment frames, shear walls, and braced frames in historical and current precedents.

Prerequisite(s): ARCH 485

Lecture: 3 Lab: 0 Credits: 3

ARCH 487**Eco Structures**

Research seminar giving focus to new technologies, especially complex structures: biotechnic, pneumatic, ultra-tall, composite structures, etc. Students conduct research using literature, data sources, and ideas to prepare imaginative small project interdisciplinary approach to solving problems in the built environment.

Lecture: 3 Lab: 0 Credits: 3

ARCH 488**Long-Span and Special Structures**

Introduction of structural systems for long spans and special structures. The structural behavior will be discussed and the required strength and stiffness will be evaluated. Individual projects will be assigned to students to be presented at the end of the course.

Lecture: 3 Lab: 0 Credits: 3

ARCH 489**Structural Systems for Tall Buildings**

The course starts by giving an overview of the state of the art of tall buildings and, in particular, super tall buildings. The developments of structural systems to resist lateral and gravity loads through the years will be explained. Many examples of tall buildings will be given showing the application of such systems. The students will be introduced to structural load design criteria, and they will be taught how to schematically design a tall building. Guest lectures from the practice will participate in the teaching. The course will also make the connection between architecture, structure, and construction. The course will draw from the city of Chicago experience. Prerequisite: Basic knowledge of structures.

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 490**Topics in Advanced Digital Design**

Digital technologies have altered the field of architecture significantly in recent years, resulting in an increased demand for specialists in the profession. Building on the knowledge and skills gained in the introductory design communications courses, these advanced electives focus on topics in digital technology and computational design. Students select from varied topics including design visualization, advanced modelling, building information systems (BIM/Revit), building performance simulation and digital fabrication among others.

Prerequisite(s): ARCH 207 or ARCH 508

Credit: Variable

ARCH 491**Topics in Architecture History & Theory**

Intended to build on the knowledge and abilities gained in the foundational architectural history and theory courses, these seminar courses focus on topics in history, theory, and criticism. Students select from varying and diverse topics such as urbanism, sustainability, design methodology, aesthetics, ethics and law, history of technology, and architecture in relation to other arts. Critical reading and writing skills are emphasized.

Prerequisite(s): (AAH 119 and AAH 120) or ARCH 500

Credit: Variable

ARCH 492**Topics in Design/Build**

These courses offer knowledge and skills related to design-build in a variety of areas. Students may select between varying and diverse topics offered by the faculty including advanced construction and material technologies, building envelope systems, advanced structural design, energy and sustainability, architectural acoustics and lighting, fabrication, and computer-aided design technologies.

Credit: Variable

ARCH 493**Topics in Visual Studies**

As architectural communication continues to include more territory and components of a project, it is important for designers to be knowledgeable about the various ways in which to communicate visually. Elective courses in the visual studies topics focus on visual representation techniques and processes, and visual perception and aesthetic judgment applied to architecture. Students select from varying and diverse topics such as visual training, collage making, freehand drawing and digital photography among others.

Credit: Variable

ARCH 494**Topics in Advanced Technology**

This research seminar examines advances in the technologies that affect the practice of architecture. The course examines leading technologies, processes, and applications, and their role in building design and production. The course will navigate the broad and varied materials related to advanced technologies in architecture by focusing on specific applications for specific projects. Students may select between varying and diverse topics offered by the faculty that may include building envelopes, architectural materials, building and environmental systems, advanced structural design, energy and sustainability, architectural acoustics and lighting, fabrication, and computer-aided design technologies.

Prerequisite(s): ARCH 215 and ARCH 230 and ARCH 404 and ARCH 335 and ARCH 403 and ARCH 334

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 495**Technology as Design**

Since the development of cast iron as a viable construction material in the mid-1800s, one path of architecture has explored the open-ended possibilities of technology. Integrated within the culture, this determination to use the technology of one's time as the creative generator of a new evolving architecture becomes the historical precedent of the thesis of this course.

Lecture: 3 **Lab:** 0 **Credits:** 3

ARCH 497**Topics in Architecture**

Investigations into topics of current interest in Architecture, Landscape Architecture or Urbanism that do not fall under the other Topics courses. The specific topics will be announced by the instructors when the courses are scheduled. Students may also propose Independent Study of projects and problems. Students must have an Independent Study advisor and have approval of the Department.

Credit: Variable

ARCH 498**Academic Training and Research Special Project**

Architecture related academic training opportunities (research projects or internships) for students.

Lecture: 0 **Lab:** 6 **Credits:** 3