

Hillier College of Architecture and Design

The Hillier College offers undergraduate programs in Digital Design, Industrial Design, both NASAD accredited, Interior Design, CIDA and NASAD accredited, and two undergraduate programs in architecture -- a four-year pre-professional Bachelor of Science in Architecture (B.S.Arch.) and a NAAB accredited five-year professional Bachelor of Architecture (B.Arch.) degree leading to licensure. The College also offers four graduate degree programs: a NAAB accredited professional Master of Architecture leading to licensure (M.Arch.), a post-professional Master of Science in architecture (MS. Arch.), a Master in Urban Design (M.U.D) and a Ph.D. in Urban Systems.

Hillier College faculty engage in funded research in a variety of areas ranging from nanomaterials to sustainable and resilient design, the later led by the College's Center for Building Knowledge. With their emphasis on technological applications to design, both schools build on the strengths of a Carnegie Classification R1 research university while preparing students to succeed as practitioners, scholars and researchers. Students also benefit from our close proximity to New York City with its unparalleled cultural resources and employment possibilities. And our location in Newark provides students with a close-up view of a city that is rapidly transforming to reclaim the luster its citizens enjoyed in Newark's heyday as a manufacturing powerhouse.

Programs

- Architecture - B.Arch. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/barch/>)
- Architecture - B.S. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/bs/>)
- Digital Design - B.A. (<http://catalog.njit.edu/undergraduate/architecture-design/art-design/digital-design-ba/>)
- Industrial Design - B.S. (<http://catalog.njit.edu/undergraduate/architecture-design/art-design/industrial-design-bs/>)
- Interior Design - B.A. (<http://catalog.njit.edu/undergraduate/architecture-design/art-design/interior-design-ba/>)

BS/MS Program Options (<http://catalog.njit.edu/undergraduate/academic-policies-procedures/special-degree-options/>)

- Architecture - B.Arch. and Management - M.S. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/barch-ms-management/>)
- Architecture - B.Arch. and Technology - M.B.A. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/barch-mba-technology/>)
- Architecture - B.Arch. and Urban Design - M.U.D. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/barch-master-infrastructure-planning/>)
- Architecture - B.Arch. and Civil Engineering - M.S. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/barch-ms-civil-engineering/>)
- Architecture - B.S. and Management - M.S. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/bs-ms-management/>)
- Architecture - B.S. and Technology - M.B.A. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/bs-mba-technology/>)
- Architecture - B.S. and Urban Design - M.U.D. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/bs-master-infrastructure-planning/>)
- Architecture - B.S. and Civil Engineering - M.S. (<http://catalog.njit.edu/undergraduate/architecture-design/architecture/bs-ms-civil-engineering/>)

Programs

- Architecture - M.Arch. (<http://catalog.njit.edu/graduate/architecture-design/architecture/march/>)
- Architecture - M.S. (<http://catalog.njit.edu/graduate/architecture-design/architecture/ms/>)
- Urban Design (MUD) - M.S. (<http://catalog.njit.edu/graduate/architecture-design/architecture/infrastructure-planning-masters/>)
- Digital Design - M.F.A (<http://catalog.njit.edu/graduate/architecture-design/architecture/fine-arts-in-digital-design-masters/>).
- Digital Design - M.S (<http://catalog.njit.edu/graduate/architecture-design/architecture/master-of-science-in-digital-design/>).

Double Majors (<http://catalog.njit.edu/graduate/academic-policies-procedures/special-programs/>)

- Architecture (professional, or post-professional) - M.Arch. and Infrastructure Planning - M.I.P. (<http://catalog.njit.edu/graduate/architecture-design/architecture/march-mip-ms/>)
- Architecture (professional, or post-professional) - M.Arch. and Management - M.S. (<http://catalog.njit.edu/graduate/architecture-design/architecture/march-management-ms/>)
- Architecture (professional, or post-professional) - M.Arch. and Civil Engineering - M.S. (<http://catalog.njit.edu/graduate/architecture-design/architecture/march-civil-engineering-ms/>)
- Urban Systems - Ph.D. (<http://catalog.njit.edu/graduate/architecture-design/architecture/urban-systems-phd/>)

College of Architecture and Design Courses

AD 1.** Design Elective. 3 credits, 3 contact hours (3;0;0).

AD 111. Communication in Art and Design - Traditional Media. 3 credits, 6 contact hours (1;0;5).

Restrictions: For Digital Design, Industrial Design, and Interior Design majors only; other majors require department approval to register. This course will explore a range of subjects from object still life to the human figure to landscape and will deal with specific issues of line, value, composition, structure, proportion and perspective. The aim of this course is to achieve a critical approach to hand-eye coordination and ideational sketching, through both direct observation and conceptual diagramming.

AD 112. Communication in Art and Design - Digital Media. 3 credits, 6 contact hours (1;0;5).

Restrictions: For Digital Design, Industrial Design, and Interior Design majors only; other majors require department approval to register. This course will help students develop a critical attitude and analytical language to explore 3D and 2D issues involved in the study of design ideas but work will be focused primarily on digital techniques and modes of expression. It will cover drawing basics and digital modeling and extracted drawing techniques and critical analysis of these techniques and other methods of graphic (and architectural) representation.

AD 150. Color and Composition. 3 credits, 4 contact hours (2;2;0).

Restrictions: For Digital Design, Industrial Design, and Interior Design majors only; other majors require department approval to register. Introduction to principles of 2D composition with emphasis on color use and color theory. Students are introduced to traditional media (watercolor and collage) and digital raster graphics (painting, image processing, and compositioning). Applications that include interior design, product/industrial design, advertising, web design, and fine arts are discussed. Concepts include grids and hierarchy, color models and mixing, color interaction, human response to color, printing, etc. Creative projects.

AD 161. History of Art And Design I. 3 credits, 3 contact hours (3;0;0).

This foundation history course surveys the principle aesthetic/functional themes and theories of the twentieth century. Students will explore how various individuals have used art and design to develop products that enriched society culturally and/or that resolved particular societal needs. The course will begin with how optics revolutionized painting, sculpture, architecture, film, etc, and explore how the modern movement broke with or reinterpreted the past through a series of flashbacks.

AD 162. History of Art And Design II. 3 credits, 3 contact hours (3;0;0).

Prerequisite: AD 161. This course explores the major art and design movements and influences of the 20th century post 1930 that set the stage for today's 21st century art and design works that increasingly deal with issues of globalization and technology and ecology. Students will investigate the cultural meaning and historical significance of the art/design product throughout the 20th and 21st century.

AD 2.** Design Elective. 3 credits, 3 contact hours (3;0;0).

AD 201. Human Factors/Ergonomics. 3 credits, 3 contact hours (3;0;0).

Prerequisites: Computing Literacy GER course, AD 150, AD 112. Restrictions: For Digital Design, Industrial Design, and Interior Design majors only; other majors require department approval to register. Through lectures and "hands-on" experiments, this course will challenge the student to explore objects and environments as sensory and psychological experiences that effect human comfort, efficiency, function and emotion. Emphasis will be put on empathizing with the user with particular attention to those individuals with special physical, cognitive or occupational needs.

AD 3.** Design Elective. 3 credits, 3 contact hours (3;0;0).

AD 325. Entrepreneurship for Designers. 3 credits, 3 contact hours (3;0;0).

AD 340. Photography and Imaging. 3 credits, 4 contact hours (2;2;0).

Prerequisites: AD 150 or ARCH 396 or permission of instructor. Restrictions: For Digital Design, Industrial Design, and Interior Design majors only; other majors require department approval to register. Photography is introduced as an artistic medium in a digital context. General photographic principles and techniques will be discussed including digital flash photography, image processing, in/on-camera filters and post-processing filters, camera controls, and compositional elements. Photographic student projects will be required. Students must provide their own DSLR camera for use throughout the semester.

AD 4.** Design Elective. 3 credits, 3 contact hours (3;0;0).

AD 463. Collaborative Design Studio. 5 credits, 11 contact hours (0;0;11).

Prerequisites: (DD 364 or ID 364 or INT 364 or ARCH 364) and PHYS 102. Restrictions: For Digital Design, Industrial Design, and Interior Design majors only; other majors require department approval to register. Interdisciplinary and multi-disciplinary design studio where students work both individually and collaboratively on team project(s) that require the integration of different design disciplines.

AD 490. Special Topics. 3 credits, 3 contact hours (3;0;0).

Prerequisites: DD 264 or ID 264 or INT 264 or ARCH 363. Restrictions: For Digital Design, Industrial Design, and Interior Design majors only; other majors require department approval to register. As determined by individual section and topic. Group investigation of problems or topics of special interest in art and design including, but not limited to, fine arts, industrial design, interior design, and digital design.

AD 491. Independent Study. 1 credit, 1 contact hour (0;0;1).

Restriction: Permission of instructor and departmental/school approval. Individual investigation of problems or topics of special interest in art and design including, but not limited to, fine art, industrial design, interior design, and digital design. Subjects may include the overlap between these areas and related areas including art/architectural history and architecture. Provides opportunities to work on a project with individual guidance from an instructor in the School of Art + Design.

AD 492. Independent Study. 2 credits, 2 contact hours (0;0;2).

Restriction: Permission of instructor and departmental/school approval. Individual investigation of problems or topics of special interest in art and design including, but not limited to, fine art, industrial design, interior design, and digital design. Subjects may include the overlap between these areas and related areas including art/architectural history and architecture. Provides opportunities to work on a project with individual guidance from an instructor in the School of Art + Design.

AD 493. Independent Study. 3 credits, 3 contact hours (0;0;3).

Restriction: Permission of instructor and departmental/school approval. Individual investigation of problems or topics of special interest in art and design including, but not limited to, fine art, industrial design, interior design, and digital design. Subjects may include the overlap between these areas and related areas including art/architectural history and architecture. Provides opportunities to work on a project with individual guidance from an instructor in the School of Art + Design.

ARCH 1. Architecture Elective. 3 credits, 3 contact hours (3;0;0).****ARCH 110. Tools and Techniques I: Introduction to Architecture Thinking. 3 credits, 3 contact hours (3;0;0).**

This course is the first of a required two-semester sequence; it introduces students to diverse tools and techniques of architecture thinking in diverse spheres of architecture culture through weekly lectures and recitations. Here, thinking is a critical disciplinary practice that parallels architecture as a practice of making, and this course is dedicated to fostering a broad understanding of what it means to “do” architecture. This fall semester course in tools and techniques of architecture thinking is followed by a spring semester of tools and techniques of architecture making.

ARCH 156. Tools and Techniques II: Introduction to Architecture Making. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 161 or ARCH 195. Introduction to digital tools in the delineation, fabrication, and representation of contemporary design.

ARCH 195. Architecture Studio I. 4 credits, 9 contact hours (0;0;9).

This course is an introduction to the fundamental principles and elements of design. Emphasis on design methods, manipulation of form and space, and representation skills using traditional and digital instruments.

ARCH 196. Architecture Studio II. 4 credits, 9 contact hours (0;0;9).

Prerequisites: ARCH 195 or ARCH 161. A continuation of ARCH 195.

ARCH 2. Architecture Elective. 3 credits, 3 contact hours (3;0;0).****ARCH 210. History of Architecture I. 3 credits, 3 contact hours (3;0;0).**

Prerequisites: ARCH 110 and ENGL 101. This course examines the history of architecture and urbanism from the Paleolithic period to the Industrialization and provides a conceptual framework for looking at and analyzing structures and spaces. The geographic scope is global with emphasis on buildings, projects, landscapes, urban environments, and designers examined in relation to the social, economic, and political climates that produced them.

ARCH 211. History of Architecture II. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 210 or ARCH 251 and ARCH 252. This course examines the history of architecture and urbanism from the eighteenth century to the early twenty-first century and builds upon the conceptual framework introduced in History I. The geographic scope continues to be global with emphasis on buildings, projects, landscapes, urban environments, and designers examined in relation to the social, economic, and political climates that produced them.

ARCH 223. Construction I. 3 credits, 3 contact hours (3;0;0).

This course is an introduction to construction processes, focusing on wood, steel, masonry, concrete materials and their related assemblies.

ARCH 224. Construction II. 3 credits, 3 contact hours (3;0;0).

Prerequisite: ARCH 223. This course surveys enclosure joints and assemblies, including roofing, insulation, doors, windows, glass and hybrid systems. It also focuses on interior and exterior finishes and their construction methodology and documentation, including Building Information Modeling (BIM).

ARCH 282. Structural Principles. 3 credits, 3 contact hours (3;0;0).

Restrictions: For Interior Design majors only, or with department approval. Course cannot be taken for Architecture Degree credit. Introduces structural statics through timber and steel design. Influences of materials and structural system choice analyzed relative to their impact on building design. Responsibilities of the architect during the structural design phase are introduced.

ARCH 283. Special Topics. 3 credits, 3 contact hours (3;0;0).

Investigation of problem of special interest in architecture.

ARCH 295. Architecture Studio III. 4 credits, 9 contact hours (0;0;9).

Prerequisites: (ARCH 196 and ARCH 110 and ARCH 156) or (ARCH 161 and ARCH 164 and ARCH 156). Examination of the technological, social and environmental issues as they relate to architectural design.

ARCH 296. Architecture Studio IV. 4 credits, 9 contact hours (0;0;9).

Prerequisites: ARCH 295 or ARCH 263. A continuation ARCH 295.

ARCH 3.** Architecture Elective. 3 credits, 3 contact hours (3;0;0).**ARCH 301. Digital Modeling and Fabrication. 3 credits, 3 contact hours (3;0;0).**

Prerequisites: ARCH 156. The seminar in Digital Modeling and Fabrication is a 3-credit course for upper level students exploring advanced 3-dimensional computer modeling techniques and data export for assembly and fabrication to various computer numerically controlled (CNC) hardware available at the School of Architecture. Specifically, students engage in NURBS and solid modeling using Rhinoceros 3D and export data through various Rhino plug-ins including RhinoCAM, which writes G- and M- Codes for 2 and 3D milling operations. CNC hardware available as of Spring 2010 includes two (2) Universal Laser Cutters, each with 18" x 32" beds; two (2) Z-Corporation Z-310 3 dimensional printers; and a Precix 9100 Industrial CNC Router with a 48" x 96" bed. Students model and fabricate full scale assemblies individually and in teams and contribute to a final exhibition of student work. Familiarity with various software tools available at the College of Architecture and Design is encouraged but not required. Admission to the course to students in their second year of study by discretion of instructor.

ARCH 303. Structures I. 3 credits, 3 contact hours (3;0;0).

This course begins with the history of building structures, continues by introducing structural behavior, forces and responses in structural systems, and concludes with an introduction to static structural analysis.

ARCH 304. Structures II. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 303 or ARCH 229. This course examines lateral forces, foundations, stability, deflection, long spans and special case structural systems. Methodology involves advanced static structural analysis.

ARCH 309. Environmental Control Systems I. 3 credits, 3 contact hours (3;0;0).

Prerequisite: PHYS 102. This course covers the basic principles and applications of passive environmental systems utilizing on-site resources to achieve thermal and visual comfort as well as energy and water conservation. The topics include climate analysis, thermal comfort, thermal envelope, solar shading, passive solar heating, passive cooling, visual comfort, daylighting, and renewables. This course is the first of a two-course sequence in building environmental control systems (309, 314) focusing on passive (architectural) solutions, yet active (mechanical/electrical) solutions are covered in the second sequence.

ARCH 310. Co-Op Work Experience I. 3 credits, 3 contact hours (0;0;3).

Restriction: completion of the third year studio class, approval of the school and permission of the Office of Cooperative Education and Internships. Students gain major-related work experience and reinforcement of their academic program. A designated faculty member monitors and evaluates the student's work and project. Requirements include mandatory participation in seminars and completion of a report and/or project. Apply in third year.

ARCH 312. Environmental Education I. 3 credits, 5 contact hours (2;3;0).

Involves architecture students in working with grade school or high school students in the solution of a joint environmental design project. Participants first work toward developing their own understanding and sensitivity of the manmade environment. Emphasis on learner-directed and discovery-guided inquiry, and educational methods to increase awareness of the physical settings created for human activities. Projects developed in nearby schools which focus on the interaction of individuals and small groups with the environment.

ARCH 314. Environmental Control Systems II. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 309 or ARCH 227. This course provides students a deeper understanding of the relationship between architectural design and active building systems. The topics include heating and cooling systems, electric lighting design, electrical energy systems, acoustical systems, building water supply, plumbing systems, and fire protection. This course is the second of a two-course sequence in building environmental control systems (309, 314) focusing on active (mechanical/electrical) solutions.

ARCH 316. Structural Computer Applications BIM. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 304. The course explores the rising BIM technology with an emphasis on its structural applications as they relate to architectural design. The course also covers some structural computer applications using different types of computer programs. It is designed to help architecture students acquire and develop a more integrated approach to architecture. The course content consists mainly of some hands-on training projects in addition to some BIM related lectures. The lectures include some case studies such as the \$611-million Nationals Park, in Washington, DC, illustrating how BIM can be successfully implemented. Various projects with different types of buildings will be used in the computerized applications.

ARCH 317. Advanced Architectural Graphics. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 296 or ARCH 264. Gives students advanced techniques for architectural expression in traditional media. A basic knowledge of drawing methods, media, materials and projection techniques is assumed.

ARCH 324. Landscape and Urbanism. 3 credits, 3 contact hours (3;0;0).

This course is about Urbanism, Landscape Architecture and the intersection of the two. Students will learn about landscape design in relation to the human condition and develop an understanding of how the design of the constructed urban environment is directly tied into, and affecting of the global climate and our environmental health. Students will learn about access, topography, surrounding buildings, natural systems, adjacent functions and zoning.

ARCH 331. Formal Principles of Landscape Design Traditions Across the Globe. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 211 or (ARCH 381 and ARCH 382). An overview of the opportunities and constraints of landscape designs. Emphasis on developing a practical understanding of the potentials of earth, water and plants in architecture. Students given an overview of social and ecological determinants of relations between land and buildings.

ARCH 332. Architecture: Image and Word I. 3 credits, 3 contact hours (3;0;0).

This course will present films on Architecture in which architects are speaking about and showing their own work. What we think is true about architecture is often wrong. Single images tend to abstract and greatly simplify why and how great architecture is created. Rarely are buildings seen in their content. Rarely are climatic, cultural and technical issues of design illustrated. AS a result, we often speculate about architecture based upon superficial or incomplete information.

ARCH 333. Architecture:Image and Word II. 3 credits, 5 contact hours (2;3;0).

This course will present films on Architecture in which architects are speaking about and showing their own work. Theoreticians provide "facts" to create a unified theory of design, which may lie outside the realm of historical reality, or the intention of the architect. The culture of architectural education and the nature of the design studio results in second hand knowledge, and design myth. Surveys of modern architecture leave a fragmentary memory of great works of architecture.

ARCH 335. Digital Tectonics. 3 credits, 3 contact hours (3;0;0).

This course uses 3D modeling tools to investigate the relationship of digital models to physical construction. The term digital tectonics refers to an idea regarding the qualities of works of contemporary architecture that seem to be influenced by the use of digital tools. In this course, students are asked to investigate this hypothesis by testing structure, skin, assemblage, form and space making methodologies that are aided by digital tools and rationalized through digital operations.

ARCH 337. Building Information Modeling. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 156 or AD 112. This course explores both technical and philosophical approaches to the use of the computer in architectural analysis, design development, information management, and document delivery. Autodesk Building Systems and Autodesk Revit Building will be used for 3D modeling and 2D documentation employing a systems-approach framework for spatial allocation, energy analysis, and structural considerations. The workings of the foundational information databases of the respective software will be thoroughly explored. Projects requirements will include building program resolution, solar analysis, asset scheduling, document layout, and design visualization. Proficiency with Autodesk Autocad (2D) and understanding of general CAD principles are required prerequisites.

ARCH 361. Adaptive Paradigms in Architecture. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 224. The course will focus on theories behind kinetic, responsive, and adaptive architecture. It will examine architecture in relation to the latest research in biology, material science, embedded systems, soft robotics, synthetic biology, bioengineering, and will address possible shifts in imagining and re-envisioning materialization of architecture. The course will underline architecture's inseparable link to technology and speculate on new possibilities for architecture as an integrated, responsive, adaptive, and productive participant within larger ecologies.

ARCH 363. Architecture Studio III. 5 credits, 12 contact hours (0;0;12).

Prerequisites: ARCH 264, ARCH 251, ARCH 252, ARCH 223 or ARCH 541G, ARCH 227 or ARCH 543G and ARCH 229 or ARCH 545G. This course is a continuation of ARCH 264. Lecture hour explores the nature of technology, environment, and social order as they relate to studio work. Course materials purchase required.

ARCH 364. Architecture Studio IV. 5 credits, 13 contact hours (0;0;13).

Prerequisite: ARCH 363. A continuation of ARCH 363. Lecture hour explores in depth the nature of technology, environment, and social order as they relate to studio work. Students will be required to purchase course materials.

ARCH 381. History of Architecture III. 3 credits, 3 contact hours (3;0;0).

Prerequisite: ARCH 252. A continuation of ARCH 252, this course surveys global developments in architecture, urban planning, and landscape design in the first half of the 20th century. It examines the continued architectural impact of industrialization and modernization and the geo-political consequences of World War I and World War II on the built environment. The focus is on the development and diffusion of modernism and its relationship to such key concepts as universalism, regionalism, historicism, and utopia.

ARCH 382. History of Architecture IV. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 381 or AD 162. Restrictions: For Digital Design and Interior Design majors only; other majors require department approval to register. This course is not part of the B.Arch and the Fall section cannot be taken for degree credit. The last in the sequence of history surveys, this course examines global developments in modern and contemporary architecture and urbanism after World War II and into the 21st century. Social uprisings, economic recessions, post-colonialism, modernization in the developing world, mass production and mass consumption, environmentalism, sustainability, and the computer revolution of the information age provide the historical and cultural framework for the course. The course pays particular attention to early extensions and critiques of modernism, the emergence of postmodernism, and current efforts to reevaluate modernism's legacy.

ARCH 395. Architecture Studio V. 4 credits, 9 contact hours (0;0;9).

Prerequisites: ARCH 224, and (ARCH 296 or ARCH 264), and ARCH 211 or (ARCH 381 and ARCH 382). This course is a continuation of ARCH 296.

ARCH 396. Architecture Studio VI. 4 credits, 9 contact hours (0;0;9).

Prerequisites: ARCH 395 or ARCH 363. A continuation of ARCH 395.

ARCH 4. Architecture Elective. 3 credits, 3 contact hours (3;0;0).****ARCH 408. Investigations in the Contemporary Landscape. 3 credits, 3 contact hours (3;0;0).**

Prerequisites: ARCH 211 or (ARCH 381 and ARCH 382). Introduces the design, construction and management of contemporary landscape projects through case studies, field trips, and personal contact with prominent practicing landscape architects. A historical perspective of landscape architecture is used as a context for discussion.

ARCH 410. Co-Op Work Experience II. 3 credits, 3 contact hours (0;0;3).

Prerequisites: ARCH 310 or approval of the school and permission of the Office of Cooperative Education and Internships. Provides major-related work experience. A designated faculty member monitors and evaluates the student's work and project. Requirements include mandatory participation in seminars and completion of a report and/or project.

ARCH 423. Advanced Construction. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 224. In this course students will learn about the relationship of contemporary architecture and current developments in the building industry and how this translates into tectonic systems. The course introduces students to manufacturing processes, assembly processes of building systems offsite and onsite, unconventional building materials and forms of representations and documentation at the intersection of design and building processes.

ARCH 429. Advanced Structures. 3 credits, 3 contact hours (3;0;0).

Prerequisite: ARCH 304. This course covers advanced topics in structural analysis, design of reinforced concrete structures, design of steel connections, in addition to some topics in masonry structures. The course also includes design examples in relation to various types of foundation systems. It focuses on indeterminate structures in structural analysis and integrated structural systems in designing structures. Case studies of some well-known buildings are covered. Some BIM applications with computerized calculations are included.

ARCH 432. P3 Post Presentation Processing. 3 credits, 5 contact hours (2;3;0).

The project is deemed Architecture, with a capital A, but there remains nagging questions: What would the project be like if viewed stereoscopically? If it were rendered as a 360 degree panoramic view, what would the space be like? If it was accurately superimposed into the site (lighting, color, texture, camera angle), does the design improve when in the context? Would rendering styles using "natural media" be more descriptive? What would the architecture be like at night?.

ARCH 461. Resilient Structural Design and Construction. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 304. This course discusses the topic of structural building design and construction for various hazards such as earthquakes, high winds/hurricanes, and floods. Each type of hazard is discussed separately. The structural design process is outlined based on the requirements of the latest codes and standards. Guidelines and recommendations for better design and construction in hazard areas are given. Design examples are used to illustrate the various design methods along with some practical building design projects. The standard procedures used in the safety assessment and evaluation of damaged buildings in the aftermath of hurricanes and earthquakes are introduced.

ARCH 463. Options Studio I. 5 credits, 11 contact hours (0;0;11).

Prerequisites: (ARCH 396 or ARCH 364), (ARCH 304 or ARCH 329), (ARCH 314 or ARCH 327) and ARCH 324. Studio methodology allows the students to select from various building programs, the nature of design dealing with technology, environment and the social order. Lecture hour coordinates with studio subject matter. Course materials purchase required.

ARCH 464. Option Studio II. 5 credits, 11 contact hours (0;0;11).

Prerequisites: ARCH 396 or ARCH 364 and ARCH 304 or ARCH 329 and ARCH 314 or ARCH 327 and ARCH 324. Studio methodology allows students to select from various building programs, the nature of design dealing with technology, environment and the social order.

ARCH 472. Professional Practice I. 3 credits, 3 contact hours (3;0;0).

Restrictions: senior standing. Covers the essentials for programming a building and understanding the full scope of project development that precedes and follows the programming phase. Identify major stakeholders in the building design and production process and examine their roles. Lectures and assignments include: user requirements and client values, methods of pro forma analysis for project development and approval, and how the development process changes over time.

ARCH 475. Professional Practice II. 3 credits, 3 contact hours (3;0;0).

Restrictions: senior standing. A forum for examination of the structure and practices of the profession of architecture. The formal and informal relationships between architects, and between architects and clients, government officials, and consultants are studied. Basic principles of office management for the small and large architectural firm are introduced.

ARCH 483. ST.: 3 credits, 3 contact hours (3;0;0).

Prerequisites: ARCH 224, ARCH 304, ARCH 314 or (ARCH 323, ARCH 304, ARCH 327). Technology Elective.

ARCH 491. Independent Study. 1 credit, 1 contact hour (0;0;1).**ARCH 493. Independent Study. 3 credits, 3 contact hours (0;0;3).****ARCH 495. Advanced Architecture Studio I. 5 credits, 11 contact hours (0;0;11).**

Prerequisites: ARCH 396 or ARCH 364, ARCH 304 or ARCH 329, ARCH 314 or ARCH 327, ARCH 324. Architectural Studios, which introduce design methods and processes that synthesis a range of design determinants while integrating technical requirements. Projects consider a variety of interrelated scales and conditions including: site, environment, user and regulatory requirements, accessibility and life safety, structural and environmental systems, building envelope design and performance, architectural and cultural history; all of which influence architectural design, both creatively and technically.

ARCH 506. Advanced Design Options II. 5 credits, 13 contact hours.

Prerequisite: ARCH 504G. Required vertical studio electives; must be taken sequentially. Covers arange of advanced design issues in depth: integration of organizational, social, technical, spatial, and aesthetic issues within consistently articulated applied design solutions.

ARCH 510. Co-op Work Experience III. 0 credits, 3 contact hours.

Restriction: Approval of the school and permission of the Office of Cooperative Education and Internships. Students gain major-related work experience and reinforcement of their academic program. Students are required to complete and present midterm and final projects and/or reports. A designated faculty member monitors and evaluates the student's work and project.

ARCH 530. Methods of Architectural Research. 3 credits, 3 contact hours.

Prerequisite: ARCH 211. This course examines the essential methodologies of architectural research directed towards advanced undergraduates in the professional program. Methods of research will include those related to qualitative and quantitative analysis, historical investigations, critical interpretation, archival and field work, and diverse approaches to design-as-research.

ARCH 531. History of Modern Architecture. 3 credits, 3 contact hours.

Prerequisites: ARCH 211. This course examines the major tendencies of architectural practice and theory in the 20th century. Formal and cultural evolution of modernism is considered in relation to social, political, economic, and technological developments that informed its key buildings, projects, and texts.

ARCH 533. History of American Architecture. 3 credits, 3 contact hours.

Prerequisite: ARCH 211. This course investigates the emergence and development of architecture and urbanism in what is now the United States, from before European contact to the early 20th century. Focus is on building typologies and urban morphologies that contributed to a definition of a distinctive "American" approach to form, style, and settlement. The complex and enduring influence of colonization, enslavement, industrialization, and immigration is emphasized throughout.

ARCH 534. Aspects of Urban + Suburban Form. 3 credits, 3 contact hours.

Prerequisites: ARCH 211 or (ARCH 381 and ARCH 382). This course examines major forms and patterns of urban and suburban development under modernity, focusing on the industrial and metropolis and its global influence. Changing concepts of the central city and the metropolitan periphery are examined in relation to cultural, socio-economic, and political developments.

ARCH 535. History of Architectural Ideas. 3 credits, 3 contact hours.

Prerequisites: ARCH 211 or (ARCH 381 and ARCH 382). Discusses seminal architectural ideas in the western world from Vitruvius to the present day. Read books written by leading architectural theorists and analyze them in detail.

ARCH 536. Landscape and American Culture. 3 credits, 3 contact hours.

Prerequisites: ARCH 324. As in architecture, the parallel discipline of landscape architecture involves artistic intention set in conjunction with utilitarian concerns. As such, designs on the land include the integration of the arts and sciences of human culture with nature. Discusses landscape as a manifestation of American culture.

ARCH 537. Cable and Tension Structures. 3 credits, 3 contact hours.

Prerequisites: ARCH 304 or ARCH 329. The course covers the structural technology, history and design considerations of cable-suspended, cable-stayed, tensioned fabric and air-supported structures, and the use of light-tensile structures in architecture. The course also offers an overview of the engineering standards that provide guidelines and recommendations for their design. A long list of well-known cable and tensioned fabric structures will be used to illustrate the structural design concepts. The examples focus mainly on buildings and roof structures. The tensioned fabric roof examples include some of the impressive projects of Geiger Berger Associates and Horst Berger Partners who pioneered the evolution of tensioned fabric structures in the US and elsewhere.

ARCH 538. Sustainable Architecture. 3 credits, 3 contact hours.

Prerequisites: ARCH 314 or INT 222. Follows two precepts: accepting responsibility for the consequences of design decisions upon human well-being, and the long-term viability of natural systems. Topics include sustainable site design and development, environmentally sensitive building materials, lifecycle assessment and cost benefit analysis of building systems, and adaptive reuse.

ARCH 541. Material Systems in Design. 3 credits, 4 contact hours.

Prerequisites: ARCH 396. This seminar will allow students to exam material systems that give design agency to matter as a creative and technical force in the making of architecture. In doing so, it will provide students an opportunity to understand and explore the role material matters play in contemporary architectural theory and praxis. Focused on the exploration and understanding of material systems, this course will provide students with the intellectual underpinnings for the re-conceptualization of matter within their own design processes.

ARCH 543. Lighting. 3 credits, 3 contact hours.

Prerequisites: ARCH 314 or INT 222. Explores, through modeling and calculation, the means by which architectural form and detail influence the luminous environment. Perceptual responses such as visual comfort and delight are examined. Topics include daylighting footprints, model design and testing, and computer-assisted light level analysis. Areas of investigation include the relationship between daylight and electric light in architecture; the variations of light with time; analysis of seasonal and weather differences; role of task in lighting strategies; and means of control for light quantity and quality.

ARCH 545. Case Studies in Architectural Technology. 3 credits, 3 contact hours.

Prerequisite: ARCH 224. Technological systems involved in the construction and use of buildings. Students conduct in-depth investigation of technology-related problems in architecture and construction. Case study method is used. Construction documents and reports are analyzed. Field visits are required.

ARCH 546. Designing and Optimizing the Building Enclosure. 3 credits, 3 contact hours.

Prerequisite: ARCH 224. Considers the building envelope, the boundary dividing the inside of a structure from the outside environment. Study and design optimal enclosures considering energy exchange, the relationship between energy and light, and life cycle costs.

ARCH 557. Problems in Modern Housing. 3 credits, 3 contact hours.

Prerequisite: ARCH 211. Attempts to provide decent, affordable and well-designed housing for broad segments of society are examined. Dwelling is examined through analysis of proto-typical design solutions in urban environments.

ARCH 559. Social Issues in Housing. 3 credits, 3 contact hours.

Prerequisites: ARCH 211 or (ARCH 381 and ARCH 382). Lecture/seminar explores the historical, economic, social, technological, and political basis for current American housing policy and practice. Examines government, community-based and private sector attempts, both failed and successful, at providing decent, affordable, and well-designed housing for broad segments of society. Student teams analyze and discuss, in a series of classroom debates, the housing and planning implications of controversial social problems from homelessness and racial segregation to caring for the elderly and people with HIV/AIDS with an emphasis on the role of the architect.

ARCH 561. Synthesis Seminar. 3 credits, 3 contact hours.

Prerequisite: ARCH 495. Design research, analysis, application and presentation of the contextual, programmatic, regulatory and technical aspects of professional architectural practice as applied to an architectural design project in the Advanced Architectural Studio II.

ARCH 566. Advanced Architectural Design Studio. 5 credits, 12 contact hours.

Prerequisite: ARCH 564. This is an advanced architectural design studio, post Comprehensive Studio, studying contemporary design theories, design methods and construction technologies. Emphasis is placed upon independent design research as it relates to the broad range of architectural practice. Exploratory and experimental architectural projects are the focus of the course.

ARCH 571. Sustainable City. 3 credits, 3 contact hours.

Prerequisites: ARCH 110. This course will focus on sustainability issues (economic, social and environmental) at an urban scale. The course will provide an overview of existing frameworks and goals and speculate on solutions. This course will focus on recent descriptions and critiques of urban space and proposals for change.

ARCH 572. Mapping Urbanism. 3 credits, 3 contact hours.

Prerequisites: ARCH 211. This seminar provides the critical tools necessary to examine the city as both a representation and a reality in flux. Through an interdisciplinary framework, students study urban history, theory, visual thinking and information design. Parallel to learning about global cities, their urban challenges, and transformative design strategies, students learn to employ a diverse set of representational techniques to create inventive mappings.

ARCH 574. Case Studies in Community and Urban Design. 3 credits, 3 contact hours.

Prerequisites: ARCH 396 or ARCH 364. In-depth investigation of specific real-world problems of urban or community design carried out using case method approach. Current practices in the U.S. and other countries studied using interviews with designers, developers, community groups and government agencies. Site visits, reports and other documents provide important sources of information. Final report with supporting documentation required.

ARCH 576. Architecture of Utopia. 3 credits, 3 contact hours.

Prerequisites: ARCH 211. Seminar for the review of utopian projects that have attempted to embody and strengthen social ideas through transformations in the structuring of space. Architectural implications of different literary and philosophical utopias analyzed with an emphasis on those experimental proposals which were realized, in whole or in part, in built form.

ARCH 583. ST.: 3 credits, 3 contact hours.

Group investigation of problem of special interest in architecture.

ARCH 591. Independent Study. 1 credit, 1 contact hour.

ARCH 592. Independent Study. 2 credits, 2 contact hours.

ARCH 593. Independent Study. 3 credits, 3 contact hours.

ARCH 595. Advanced Architecture Studio II. 5 credits, 11 contact hours.

Prerequisites: ARCH 495 or ARCH 563. Corequisites: ARCH 561. Architectural Studios developing require design proposals that synthesis a diverse range of design determinants while integrating technical requirements and performance. Projects consider a variety of interrelated scales and conditions including: site, environment, user and regulatory requirements, accessibility and life safety, structural and environmental systems, building systems design and performance, architectural and cultural history; all of which influence architectural design, both creatively and technically.

DD 263. Digital Design Studio I. 4 credits, 9 contact hours (0;0;9).

Prerequisites: AD 111, AD 112. Pre or Corequisite: AD 150. Restrictions: For Digital Design majors only or with department approval. Foundations of three dimensional design and image making. Project based applications focusing on the design and digital representation of narrative sequences and architectural or environmental settings for games, theater, advertisements, books, or similar contexts. Course includes modeling with different geometries (e.g. NURBS, polygonal) and advanced techniques in rendering with lighting and materials as well as issues of production design.

DD 264. Digital Design Studio II. 4 credits, 9 contact hours (0;0;9).

Prerequisites: AD 111, AD 112, AD 150, and DD 263. Restrictions: For Digital Design majors only, or with department approval. Foundations of motion based design and narrative exploring concepts of linear, motion-based two-dimensional media including motion graphics, live action filming, particle systems, digital video editing and digital video compression. Project based applications focusing on the design, production and post production of motion sequences for cinema, games, theater, advertisements, or similar contexts.

DD 275. History of Games. 3 credits, 5 contact hours (2;3;0).

Prerequisites: AD 111, AD 112 and AD 162 or ARCH 163, ARCH 263 and ARCH 251. Restrictions: For Digital Design majors only, or with department approval. A guided exploration through the world of games. Students will experiment, play, and analyze various aspects of games - from early traditional games to current generation electronically-mediated games; from individual games to collaborative online games. Game types will be analyzed with particular attention paid to the virtual environments in which these games take place. The expressive and persuasive aspects of games will also be explored.

DD 284. Video and Animation. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 112 and AD 150 or equivalent with instructor's and program permission. Restrictions: For Digital Design majors only, or with department approval. Laboratory course exploring concepts of linear, motion-based two-dimensional media and includes motion graphics, live action filming, particle systems, digital video editing and digital video compression. Projects include the design and production of multiple projects addressing both technical and creative decision making.

DD 301. Acting Fundamentals for Animators. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 111, AD 112, AD 150 and DD 263. Introduction to the historical contexts of acting. Survey of acting techniques and principles and their relationship to successful visual storytelling. Topics covered include movement, empathy and dialogue. Application of acting to two- and three-dimensional animation. Students will study examples from animation as well as film and theater. Required projects include both in-class acting exercises as well as storyboard creation and directed computer graphics character animation.

DD 303. Foundations of Sound and Music. 3 credits, 3 contact hours (3;0;0).

Restrictions: For Digital Design majors only, or with department approval. A multimedia course to give an understanding of music theory and musicology. Survey of the history of music and musical movements, and the use of music in motion pictures, digital media, and interactive entertainment. An introduction to instrumentation, music notation, music theory world musicology, and ear training as well as the relationship between music and culture. Visual and audio components are included.

DD 320. Robotics for Architects and Designers. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 112, AD 150; or ARCH 295; or instructor approved equivalents. This course is for students who would like to explore and produce interactive and kinetic products or building prototypes using microcontrollers (Arduino), sensors, and actuators. The course will focus on producing creative and aesthetically articulated applications of robotic technologies. Topics include applications of adaptable, responsive, and distributed systems to various fields of design. The course will take a hands-on approach to learn about sensors (such as light, sound, motion, and gesture-tracking sensors, for example, Microsoft Kinect sensor), actuators (such as servo motors), graphic/game design/simulation software (Processing, Unreal Engine, and Unity3D), and prototyping using available digital fabrication tools such as laser cutters, 3-D printers, and CNC machines at the CoAD and others. Topics from IoT (Internet of Things) will be also explored for those who are interested in creating smart products. Recommended for 5th-, 4th-, and 3rd-year students with basic knowledge on programming, 3-D modeling, and digital fabrication skills. Open to students from any college. Non-CoAD students with appropriate backgrounds are welcome to join the course.

DD 321. Interactive and Reactive Environments. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 112, AD 150 and DD 284, or ARCH 295, or instructor permission. This course will investigate contemporary attitudes toward digital public spaces, from mainstream media facades, interactive art installations, and mobile applications to guerrilla-like techniques such as tactical media, activist gaming, and electronic civil disobedience. Based on their research of relevant precedents, students will design a 2D and/or 3D interactive environment.

DD 334. Simulated Environments. 3 credits, 3 contact hours (3;0;0).

Prerequisites: DD 263, DD 264 or ARCH 295. Pre or Corequisites: DD 275. Restrictions: Digital Design majors only, all others with permission of the department. This course will explore the application of desktop, non-immersive virtual reality to the representation of architecture. Course exercises and projects are designed to uncover both advantages and limitations of this emerging technology, on both practical and theoretical levels. The major focus of the course will be personal evaluation of these tools in the design of both object-specific and the spatial in architectural problem solving. The collaborative nature of the toolkit will inform design decisions vis-a-vis observation of participant behavior and open discussion with interactive critics.

DD 363. Digital Design Studio III. 5 credits, 11 contact hours (0;0;11).

Prerequisites: DD 263, DD 264, AD 161, AD 162, AD 150. Pre or Corequisites: DD 275, ARCH 382. Three-dimensional design in a digital milieu. Project-based applications focusing on the design and digital representation of architectural or environmental settings for games, theater, advertisements, books, or similar contexts. Course includes modeling with different geometries (e.g. NURBS, polygonal) and advanced techniques in rendering with lighting and materials as well as issues of production design.

DD 364. Digital Design Studio IV. 5 credits, 11 contact hours (0;0;11).

Prerequisites: ARCH 382, DD 275, DD 363, IT 201. Design studio focusing on two- and three-dimensional visual communication of data, including interactive and scripted/animated communication as well as still-image utilization. Applications may include website creation, information kiosks, exhibit design, educational videos, scientific visualization, and other graphics-intensive projects.

DD 403. Digital Sound and Music. 3 credits, 3 contact hours (3;0;0).

Restrictions: For Digital Design majors only, or with department approval. A studio class that provides a baseline understanding of sound design within an animated video and video game environment. Course includes an introduction to sampling, field recording, sound effects, production techniques, and general sound design for the purpose of integrating and managing the integration of audio in motion pictures, television, and video games. Analytical and creative projects are required.

DD 415. Web/Exhibit Development. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 150, DD 284, IT 201. Instructor may waive or accept alternate prerequisite(s) based on individual student preparation. Overview of multimedia exhibit design dealing with issues of graphic identity human-computer interactions, and information visualization as tools for comprehension, enhanced communication, and effective decision-making. Exhibit types include educational symposia, museum/gallery shows, and online environments. Analyses and creative project(s) are required.

DD 442. Visual and Special Effects in Movies. 3 credits, 3 contact hours (3;0;0).

Restrictions: For Digital Design majors only, or with department approval. The creating of narrative-dependent moving images pushes the boundaries of entertainment technology. This class investigates the progress of visual and special effects as viewing moved from the Kinetoscope to 4K digital projection. The use of mirrors, cameras, and other analog devices along with information technology enabled effects including computer generated imagery are studied. Analytical and creative projects are required.

DD 443. 2-Dimensional Character Design. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 111, DD 275 and DD 264. This course focuses on the design of characters for 2-Dimensional media such as graphic novels, 2D video games, model sheets for 3D creation, concept art and the like. Students will create both humanoid and creature-based characters by using a variety of skill-sets, including basic anatomy, illustrating age, acting (through characters), prop and costume design, etc. Students will also learn pre-production tools such as reference gathering, concept sketches and mood boards.

DD 444. 3-Dimensional Character Design. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 111, DD 275, DD 264 and DD 301. In-depth exploration of 3D character design, modeling and animation for video games and cinematographic production. Conceptual and technical/production topics are considered. Precedent studies are required from sources including illustration, gaming and video/animation disciplines as well as theatrical and cinematographic choreography including fashion designers and make-up artists. 3D modeling, UV unwrapping, texturing and rigging as well as pipeline production processes are also included.

DD 449. Imaginary Worlds: Architecture in Motion Pictures. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 112, AD 161, AD 162 or ARCH 211, ARCH 395. Restrictions: DD cohort designation for DD majors only. Like childhood photographs in family albums, movies are part of our collective memories and become a unique way of "remembering" an era or place even one that has never existed or could exist. The study of imaginary worlds in motion pictures provides students with opportunities to gain an awareness of architecture and study it from different perspectives. Movies studied will be limited to those that postulate new, or unique, environments rather than those films that faithfully document reality. Discussions will focus on architectural issues raised by the movies studied as well as those found in critical essays.

DD 464. Digital Design Studio III. 5 credits, 11 contact hours (0;0;11).

Prerequisite: DD 364. Continuation of Digital Design Studio II with projects of greater complexity requiring the selection and use of multiple media (including time-based media) in the preparation and completion of creative work. Independent research and production by each student is required for all projects. Production of both passive and interactive projects will be part of the studio program.

ID 203. Past, Present and Future of Design. 3 credits, 3 contact hours (3;0;0).

Restriction: Sophomore level or higher. Intensive survey course marking pivotal design paradigm shifts from ancient cultures through the industrial revolution, the present day and projecting into the future, this course focuses on the human activity called design. Case studies of selected cultures and designers will expose the student to the forces, history, methods, styles and meanings that shape the human ecology.

ID 216. Modeling and Prototyping. 3 credits, 3 contact hours (3;0;0).

Corequisites: ID 263. Restrictions: Sophomore level or higher; For Industrial Design majors only, or with department approval. Introduction to the drafting skills, techniques and methods needed to communicate a design for fabrication as well as the materials, tools and techniques to make full size working prototypes. The drafting component of the course will cover orthographic, isometric, line weight, dimensioning and specifications. Building from the drafting component of the course, the prototypes component will - through work in the model shop - introduce the student to the most common fabrication techniques, tools and methods used to build appearance and working prototypes in various materials.

ID 217. Modeling and Manufacturing. 3 credits, 3 contact hours (3;0;0).

Prerequisite: ID 216. Corequisite: ID 264. Restriction: For Industrial Design majors only, or with department approval. This course will build on the computer modeling techniques of the ID 216 course and combine it with the programs, tools and facilities used in Computer-Aided Manufacturing (CAM). The student will take computer-generated designs and feed them directly into the manufacturing system. The course will also explore Computer Aided Manufacturing as a means of facilitating mass customization: the process of creating small batches of products that are custom designed to suit each particular user.

ID 263. Industrial Design Studio I. 4 credits, 9 contact hours (0;0;9).

Prerequisites: AD 111 and AD 112. Corequisite: AD 150. Restriction: For Industrial Design majors only, or with department approval. Students are introduced to designing objects, environments and systems through a series of exercises in conceptual, abstract, and strategic thinking as it applies to the small and large-scale artifact. The relationship between function structure materiality, production aesthetics and human needs are introduced and tested.

ID 264. Industrial Design Studio II. 4 credits, 9 contact hours (0;0;9).

Prerequisites: AD 150 and ID 263. Restrictions: For Industrial Design majors only, or with department approval. This course is a continuation of ID 263 with the focus shifting toward selected problems derived from the areas of work, health, education, recreation and communication. Introduction to the case study method of analyzing existing products.

ID 301. Industrial Design Specialization. 3 credits, 3 contact hours (3;0;0).

Corequisite: ID 363 (or higher) or INT 363 (or higher). Restriction: Permission of Art + Design Advisor. This project-based course will expose the student to one of many specialties within the Industrial Design profession that may include industry-specific design explorations and case studies in areas that include the design of furniture, consumer products, toys, footwear and apparel, jewelry, lighting, exhibits, way-finding graphics, transportation, etc.

ID 310. Ethnographic and Marketing Research. 3 credits, 3 contact hours (3;0;0).

Restriction: Junior level or higher. Research methodologies will be explored and conducted as a means to lend an objective understanding of user needs, desires and motivations. This will occur through well documented interviews, surveys, observations and interventions. The information gathered will be used to shape new products, add value to existing products or give insight to yet unexplored products or marketing opportunities.

ID 312. Mechanics and Electronics. 3 credits, 3 contact hours (3;0;0).

Corequisite: ID 263. Restrictions: Sophomore level or higher; For Industrial Design majors only, or with department approval. This is an advanced research course that addresses products which employ electronics predominantly as the major factor of design, then products that employ mechanical systems as the major determining factor, finally, the interpolation of the mechanical with the electronic with a focus on the human interface with these products.

ID 340. Materials and Processes. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 201 or ARCH 295. Restrictions: Junior level or higher. The student will be introduced to the basic materials and processes used in manufacturing of both short run and mass-produced objects. The course will comprise of lectures, field trips and design exercises employing both traditional and state-of-the-art manufacturing processes.

ID 341. Sustainable Materials and Processes. 3 credits, 3 contact hours (3;0;0).

Prerequisites: ID 340 or ARCH 295. Restrictions: Junior level or higher; For Industrial Design majors only, or with department approval. The course will comprise of lectures and field trips that take a critical look at the traditional materials and processes used in manufacturing and evaluate alternatives based on research and experimentation. Each student will perform a Life Cycle Analysis (LCA) on an existing product by following the product's life from the mining of raw materials to disposal taking particular attention to energy usage, use of natural resources, toxicity and decomposition.

ID 363. Industrial Design Studio III. 5 credits, 11 contact hours (0;0;11).

Prerequisite: ID 216, ID 217 and ID 264. This project specific studio will address real-world needs, parameters, and research as it applies to market trends and industry focused development. Companies and entrepreneurs will be invited to submit industry or need specific project briefs to the studio which will become the project for the semester. The students will experience first-hand the challenges of designing, building and testing within a real-life, interdisciplinary framework. The company will participate as sponsor, mentor and partner to the students.

ID 364. Industrial Design Studio IV. 5 credits, 11 contact hours (0;0;11).

Corequisites: ID 216, ID 363, AD 201. A knowledge and evidence-based studio that addresses real-world needs, parameters, and research. Work and product design(s) may be derived from requirements that include governmental and non-governmental not-for-profit organizations as well as from research about needs that can affect the social, physical, and economic health of individuals.

ID 370. New Product Testing. 3 credits, 3 contact hours (3;0;0).

Prerequisite: AD 201 or ARCH 295 or permission of instructor. A hybrid course combining hands-on physical testing of products with lectures, readings, and case study presentations (both group and individual- oral and written). Multiple evaluative criteria (e.g safety, value, sustainability) will be discussed, established, and tested on a variety of product types. Students may be required to provide/purchase a limited number of items for destructive testing. In-class student participation required.

ID 410. Professional Practice and Ethics. 3 credits, 3 contact hours (3;0;0).

Restriction: Senior level. This course covers the concepts of legal rights, copyrights, responsibilities and obligations of the designer, re: liabilities, contract review, patents, royalties, etc. The course also covers areas of responsibility in owner-offices, within corporate offices, working with design consultants and procedures for establishing a professional design practice. The course will also focus on the ethics of practice, research and marketing within a social, political and cultural context.

ID 463. Industrial Design Studio V. 5 credits, 11 contact hours (0;0;11).

Prerequisite: ID 364. This studio will draw from the vast academic talent at NJIT by partnering Industrial Design students with students in the other colleges and departments on campus such as engineering, architecture, management and computing. The students will develop methodologies for achieving effective collaboration and integration of industrial design with other disciplines, especially in the early phases of product development, through an industry specific design project.

ID 464. Industrial Design Studio V. 5 credits, 11 contact hours (0;0;11).

Prerequisites: ID 364 and PHYS 102. A comprehensive studio with projects (including multi-disciplinary projects) of advanced design and complexity. Students will work to initiate research and development of projects within the studio to demonstrate a full range of professional competencies, including but not limited to, the ability to independently critique work in progress. Completed work and presentation materials are expected to be exhibitable quality.

INT 221. Building and Interior Systems I. 3 credits, 3 contact hours (3;0;0).

Restrictions: For Interior Design majors only, or with department approval. An introduction to, and overview of, large-scale systems used in and affecting the design of building interiors. The operation and impacts of heating, ventilating, and air conditioning equipment on building space and layout are emphasized. Additional topics include the design of plumbing and waste systems as they affect building planning and the design of related spaces (including kitchens and bathrooms) and the use and design requirements for vertical transportation in building interiors.

INT 222. Building and Interior Systems II. 3 credits, 3 contact hours (3;0;0).

Prerequisite: PHYS 102. Restriction: For Interior Design majors only, or with department approval. An introduction to, and overview of, small-scale systems used in and affecting the design of building interiors. The needs and scope of design potentials in electrical systems (including requirements for media installations) and lighting design as they are used in, affect the design of, interiors are emphasized. Also included is an introduction to building acoustics and how basic principles affect design layout and material and furniture selection for a variety of building and construction types.

INT 263. Interior Design Studio I. 4 credits, 9 contact hours (0;0;9).

Prerequisites: AD 111, AD 112. Corequisite: INT 221. Pre or Corequisite: AD 150. Restriction: For Industrial Design majors only, or with department approval. A hands-on studio based introduction to the basic principles and elements of design for interior design students. Emphasis on design methods using multiple media, manipulating form and space. Course includes lectures, readings, analytical exercises, and (primarily three-dimensional) design projects.

INT 264. Interior Design Studio II. 4 credits, 9 contact hours (0;0;9).

Prerequisites: AD 150, INT 263. Corequisite: INT 222. Restriction: For Interior Design majors only, or with department approval. A continuation of Interior Design Studio I. A hands-on studio course that expands introductory design problems into commercial interiors and public spaces. Interior design as a knowledge-based discipline is introduced. Emphasis is placed on the development of an iterative and reflective design process as well as the production and presentation of interior design proposals. Preliminary integration of multiple technical variables is included.

INT 321. Methods and Materials. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 111, AD 112, AD 150 or ARCH 334, AD 161, AD 162 and ARCH 251. Restriction: For Interior Design majors only, or with department approval. The study of materials, products, and assemblies used in interior design. The course covers code requirements and life safety, specification, installation, performance of materials (including fabrics and textiles), and sustainability of material selection and utilization. Also covered are the impacts of materials utilization on health and interior environmental quality.

INT 322. Contract Documents. 3 credits, 3 contact hours (3;0;0).

Prerequisites: INT 321, INT 363. Pre or Corequisites: ARCH 282. Restrictions: For Interior Design majors only, or with department approval. The course addresses issues of standards and methods of ethical and professional practice. It covers the production of contracts between the professional design service provider and clients as well as various project deliverables used in initial design phases through project close out. Document types covered include letters of agreement, contract document drawing sets and addenda sketches, specifications, schedules and budgets.

INT 350. History of Furniture. 3 credits, 3 contact hours (3;0;0).

Prerequisites: AD 161 and AD 162 or equivalent; or ARCH 295. Survey course studying the history and characteristics of furniture design from antiquity to the present day. Study of social and design forces influencing furniture. Students will analyze furniture in terms of style, aesthetic intent, construction and materials, ergonomics, universal/barrier-free accessibility, sustainability, and technology. Major stylistic movements will be discussed.

INT 351. Furniture Design. 3 credits, 5 contact hours (2;0;3).

Prerequisites: INT 264 or ID 264 or DD 364 or FA 264 or ARCH 211. Corequisite: Studio enrollment. This course is an introduction to the concepts, materials and construction technologies involved in the design and fabrication of furniture. It explores the relationship between ergonomics, comfort and function in the design of furniture for both site-specific environments and mass-produced applications. Course includes lectures, field trips and a variety of drawn, modeled, and built design projects.

INT 363. Interior Design Studio III. 5 credits, 11 contact hours (0;0;11).

Prerequisites: INT 222, INT 264. Pre or Corequisites: INT 221, INT 321, INT 350. Design studio focusing on residential design. The course includes a study of the relationship of human behavior to design emphasizing dwelling, security, comfort, and home. The correlation between furniture use and selection and residential space is explored. Variables studied include aesthetics and design organization, as well as the link between residential design and interior systems like lighting and plumbing.

INT 364. Interior Design Studio IV. 5 credits, 11 contact hours (0;0;11).

Prerequisites: INT 221, INT 222, INT 321, INT 363. Pre or Corequisites: ARCH 282. A continuation of the studio sequence with design and space planning projects of increasing complexity selected within the context of commercial and institutional building types - from office environments and healthcare facilities to religious venues and community facilities. Students are expected to further develop skills to simultaneously resolve conceptual, technical, aesthetic, and functional aspects of designs.

INT 464. Interior Design Studio V. 5 credits, 11 contact hours (0;0;11).

Prerequisites: ARCH 282, ARCH 337, INT 321, INT 322, INT 364. Corequisite: AD 201. A comprehensive studio with projects of advanced design and programming complexity concentrating on larger multi-level institutional and/or mixed-use building types. Students will work to initiate research and development through all design phases to synthesize the functional, sociological, aesthetic, regulatory, and project-specific technical requirements of their projects as they relate to interior design.