College of Architecture

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Courses

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Architecture


A46 ARCH 108A You Are Here: Engaging St. Louis's Racial History Through Site + Story

By acknowledging the pressures and pains of our political moment -- a time of crisis for many in our city and nation, but also a long-awaited reckoning with issues of social justice -- this course engages the complex history of race and racial injustice in St. Louis through site- and story-based exploration. It offers an opportunity to learn about the city's landscape, history, systems, culture, form and identity while wrestling with fundamental questions of power, positionality and perspective. "You Are Here" references orientation, discovery, otherness and place, and it serves as a provocation for reconsidering how designers, artists and architects engage St. Louis. This course may count toward the minor in Creative Practice for Social Change if bundled with "Engaging Community: Understanding the Basics." Priority will be given to first-year Sam Fox students.

Same as F20 ART 108A
Credit 1.5 units. Art: CPSC

A46 ARCH 111 Introduction to Design Processes I

This introductory architectural design studio engages the basic principles of architectural context, composition and experience. Through various fieldwork strategies, students explore architectural context through observation, analysis and invention. The site-specific design processes bridge two-dimensional and three-dimensional work, including drawing, drafting and making. The experiential qualities of architecture are introduced through basic considerations of scale and human interaction. The course work includes studio, work, lectures, presentations by students, readings, writing assignments and field trips.
Credit 3 units.

A46 ARCH 111B Introduction to Design Processes I

This introductory architectural design studio engages the basic principles of architectural context, composition and experience. Through various fieldwork strategies, students explore architectural context through observation, analysis and invention. The site-specific design processes bridge two-dimensional and three-dimensional work, including drawing, drafting and making. The experiential qualities of architecture are introduced through basic considerations of scale and human interaction. The course work includes studio, work, lectures, presentations by students, readings, writing assignments and field trips.
Credit 3 units.

A46 ARCH 112 Introduction to Design Processes II

This core design studio engages the basic principles of architectural design through iterative processes of drawing and making, using a variety of tools, media and processes. The course work includes studio work, lectures, student presentations and local field trips. Prerequisite: A grade of C- or better in Arch 111 or co-registration in Arch 111.
Credit 3 units.

A46 ARCH 112B Introduction to Design Processes II

This introductory design studio course engages the basic principles of architectural context, composition and experience. Using the theme of Drawing and Observing, the studio integrates design and drawing to challenge the students to observe the world more carefully, creating narrative drawings that serve as a foundation for design proposals. Throughout the semester, students will engage various design processes -- including freehand drawing, collage, orthogonal projection and model making -- that will serve as a window into the field of architecture. The projects include design proposals for small structures in public spaces, such as pavilions or urban furniture, which emphasize the experiential qualities of architecture and the basic considerations of building scale, human interaction, inhabitation and empathy. Using observation, analysis and invention, the class sessions alternate between drawing and making, constantly bridging two-dimensional and three-dimensional work. Course work includes drawings, models, and drawing in studio and on-site.
Credit 4.5 units.

A46 ARCH 144 Architecture for Non-Architects

Architecture for Non-Architects introduces non-architecture students to the process through which architects think about, view and produce the built environment. This new course is meant to serve as an alternative to the traditional studio instruction in the major, thus allowing students who are curious about architecture to experience it without the demands and commitment of major courses. If a student decides to transfer into the architecture major later on, they will meet with the architecture minor lead advisor to jointly propose a planned course of study that addresses any missing credits and foundational skills required for successful completion of the architecture major. This foundational course proposes a combination of readings, class discussions and research that will be used to inform the design process. Field trips will initiate students into the act of seeing by challenging them to observe, interpret and critically engage with the built environment ("the site") and those who are affected by it ("the stakeholders") in specific scalar and temporal contexts.
Credit 3 units. EN: H
A46 ARCH 183 Practices in Architecture, Landscape Architecture and Urban Design
This course offers first-year students in the College of Architecture an introduction to the subjects, theories, and methodologies of the disciplines of architecture, landscape architecture, and urban design. Examples drawn from a range of both historical periods and contemporary practice highlight distinct processes of thinking and working in each discipline as well as areas of intersection and overlap.
Credit 1 unit.

A46 ARCH 183A Practices in Architecture + Art + Design
This course offers first-year students in the College of Architecture an introduction to the subjects, theories, and methodologies of the disciplines of art, design, architecture, landscape architecture, and urban studies. Examples drawn from a range of historical periods as well as contemporary practice highlight distinct processes of thinking and working in each discipline, as well as areas of intersection and overlap.
Credit 1 unit.

A46 ARCH 183B Practices in Architecture + Art + Design
This course offers first-year students in the College of Architecture an introduction to the subjects, theories, and methodologies of the disciplines of art, design, architecture, landscape architecture, and urban studies. Examples drawn from a range of both historical periods and contemporary practice highlight distinct processes of thinking and working in each discipline as well as areas of intersection and overlap.
Credit 1 unit.

A46 ARCH 184 Practices in Architecture, Landscape Architecture and Urban Design
This course offers first-year students in the College of Architecture an introduction to the subjects, theories, and methodologies of the disciplines of architecture, landscape architecture, and urban design. Examples drawn from a range of historical periods as well as from contemporary practice highlight distinct processes of thinking and working in each discipline while at the same time highlighting areas of intersection and overlap.
Credit 1 unit.

A46 ARCH 204 Fundamentals of Design II
This course offers studio exercises that emphasize three-dimensional design issues: problem solving, materials, structure, fracture, spatial relationships and systematic processes of design. 20 studio hours per week.
Credit 4 units.

A46 ARCH 209 Design Process
Open to Engineering, Arts & Sciences, Business, and Art students at all levels. This studio course will engage students in the process of design with an emphasis on creative thinking. Course content relates directly to the interests of engineers, arts & science, business and art students who wish to problem solve about positively shaping the texture and quality of the built world. A series of 2D & 3D hands-on problem-solving projects introduce students to design concepts as they apply to site (eco-systems and outdoor places), to humanistic place making (personal and small public spaces), to structure & materials (intuitive exploration of structural principles though model building), to environmental issues (effects of climate, light, topography, context and sensible use of natural resources). No technical knowledge or special drawing/model-making skills are required. There will be informal group and individual discussions of each person’s stages in inquiry. The investigations will take the form of study models made of recycled materials. Guest lecturers will participate throughout the semester. The concluding project for the semester will allow each student to work with their unique academic and personal interests, utilizing the process of lateral thinking. Course fee is applied to cost for mandatory fingerprint background check.
Credit 3 units. Art: CPSC EN: H

A46 ARCH 211B Introduction to Design Processes III
Introduction to Design Processes III engages design through the lens of perception by investigating the relationship between materiality and inhabitable space situated in a natural context. Prerequisites: successful completion of Arch 111 and Arch 112 with a grade of C- or better or successful completion of Arch 210 with a grade of C- or better.
Credit 4.5 units.

A46 ARCH 211C Introduction to Design Processes III
Introduction to Design Processes III engages design through the lens of perception by investigating the relationship between materiality and inhabitable space situated in a natural context. Prerequisites: successful completion of Arch 111 and Arch 112 with a grade of C- or better or successful completion of Arch 210 with a grade of C- or better.
Credit 6 units.

A46 ARCH 212B Introduction to Design Processes IV
Studio course that initiates architectural and building issues such as building analysis, structure, organizational systems, and programming. Prerequisite: successful completion of Arch 211B with a grade of C- or better.
Credit 4.5 units.

A46 ARCH 212C Introduction to Design Processes IV
Studio which initiates architectural and building issues such as: building analysis, structure, organizational systems, and programming. Prerequisites: successful completion of Arch 211C with a grade of C- or better.
Credit 6 units.

A46 ARCH 241 Community Dynamics
This course builds on the investigations of A46 307X Community Building and concentrates on the economic, political and social dynamics shaping neighborhoods. In order to ground discussions in reality, the class immerses itself in the urban laboratory of St. Louis while relating local issues to broader trends. A survey of the paradigms of American urban design and planning will provide an overview of the creative strategies (and ongoing contradictions) of redevelopment in the 21st century. Students will be exposed to a range of research methods for understanding deep, relational, political and legalistic dynamics shaping communities.
Credit 3 units. Art: CPSC

A46 ARCH 243 Design as Export
This course introduces students to the contemporary global characteristics of design in the late 20th and 21st century. The marketing, fabrication, distribution and consumption of design is global, yet the cultural and formal identity of most design
products are national and regional. How do traditions of design and quality based on centuries of a national and regional design culture react and adapt to a global market? What is the culture of design? What is design identity? Italian design is the primary focus of this course, followed by Japanese and Asian design and manufacturing. Case studies include examples of industrial design, fashion design, communication design and automobile design. The course also includes presentations by design curators and representatives of various international design companies.
Credit 2 units.

A46 ARCH 2647 Italian Language (Florence)
This course covers Italian grammar and conversation for study abroad students in Florence. Taught entirely in Italian. There is an emphasis on class participation accompanied by readings and writings. The student develops facility speaking the language on an everyday basis.
Credit 3 units.

A46 ARCH 2661 Semester Abroad Program Seminar
This course will prepare students participating in the Sam Fox School's Semester Abroad Programs. The seminar will meet eight times over the course of the semester. Attendance is mandatory for students going abroad. Prerequisite: College of Art and College of Architecture students selected for the Sam Fox School Abroad Programs.
Same as F20 ART 2661
Credit 3 units.

A46 ARCH 275 Service Learning Course: Environmental Issues
This service learning experience allows Washington University students to bring their knowledge and creativity about the many subjects they are studying to students at the Compton-Drew Middle School, adjacent to the Science Center, in the City of St. Louis. This course is for arts and sciences students of differing majors & minors, business, architecture & art students, and engineering students from all engineering departments. The first third of the semester students will: 1) begin learning the creative process of lateral thinking (synthesizing many variables, working in cycles); 2) work with a teammate to experiment with the design of 2D & 3D hands-on problem-solving workshops about exciting environmental issues, for small groups of students at Compton-Drew Middle School; 3) devise investigations for the workshops about environmental issues embracing the sciences, the humanities, and the community; 4) each student will work with the professor individually and in their team, as well as seek advice of faculty from a specific discipline, through the semester in the preparation of their evolving curricular plan. During the last two thirds of the semester Washington University students will be on-site during the Compton-Drew school day, once a week on each Monday from 11:00 a.m. to 12:30 p.m., to teach small group workshops for some of the sixth and seventh grade students. This course is open to freshmen, sophomores and juniors.
Credit 2 units.

A46 ARCH 300A Design Foundations Studio
This is an intensive three-week course that sets students up to enter the first of a two-semester studio sequence. The first-year sequence introduces students to architectural design, focusing on conceptual, theoretical, and tectonic principles. Enrollment is open to first-semester MArch 3 students only.
Credit 3 units.

A46 ARCH 303B Design Drawing
Drawing is a fundamental act that is intrinsic to who we are as visual designers, visual thinkers, visual learners, visual problem solvers, and visual communicators. We drew even before we could write. It is an integral part of a design process and foundational to how we navigate the digital world. This course will explore all these aspects of drawing and its role in today’s culture. It is a hands-on course that allows students to explore and experiment with a variety of representational media, including freehand drawing, rendering, and digital drawing. An emphasis will be put on drawing as a way of searching for and discovering design solutions. The majority of the drawings produced will not be ends in themselves as finished products; rather, drawing will serve as a process-driven medium for exploring new ideas and design solutions.
Credit 3 units.

A46 ARCH 303C Unveiling the Detail: A Lesson in Forensic Drawing & Discovery
This course will explore architectural detailing from the quotidian to the sublime to posit architectural design intent. Through fieldwork and research, students will study the role of architectural detailing in the configuration and execution of architectural space making. Students will be asked to carefully observe their own constructed environment and architectural precedents to understand the truth and fiction in construction. This course seeks to help students understand the role of the architectural detail in articulating and reinforcing architectural concepts. It will strengthen the student's understanding of material properties, opportunities and limitations, construction sequencing, and design execution. Students will gain a new appreciation for the exquisitely executed architectural detail and strengthen the skill to anticipate and navigate detailing challenges in their own design work. Students will be asked to explore architectural details through various drawing methods, modeling, and modes of representation. This course is open to architecture students at all levels with an interest in drawing and realizing architecture as a constructed practice.
Credit 1.5 units.

A46 ARCH 307X Community Building
This course looks at the intersection of the built fabric and the social fabric. Using St. Louis as the starting point, this course takes students out of the classroom and into a variety of neighborhoods — old, new, affluent, poor — to look at the built environment in a variety of contexts and through a variety of lenses. Almost every week for the first half of the semester, students visit a different area (or areas), each trip highlighting some theme or issue related to the built environment (architecture, planning, American history, investment and disinvestment, community character and values, race, transportation, immigrant communities, future visions, etc.). Running parallel to this, students are involved in an ongoing relationship with one particular struggling neighborhood, in which students attend community meetings and get to know and become involved with the people in the community in
a variety of ways. Students learn to look below the surface, beyond the single obvious story, for multiple stories, discovering their complexity, contradictions and paradoxes. They also come to consider the complex ways in which architecture and the built environment can affect or be affected by a host of other disciplines. College of Architecture and College of Art sophomores, juniors, and seniors have priority. Completes Sam Fox Commons requirement. CET (https://gephardtinstitute.wustl.edu/for-faculty-and-staff/community-engaged-teaching/) course.

Credit 3 units. Art: CPSC

A46 ARCH 308X Community Building North
This course addresses the complex economic, political and racial landscape of north St. Louis County focused on Ferguson, Missouri, as the embodiment of problems and conflicts endemic to urban communities across the country. The events following Michael Brown’s shooting death on August 9, 2014, have revealed deep divisions in the St. Louis metropolitan area. Our multidisciplinary approach will be evident as we investigate the intersecting, compounding roles of social and economic inequities, racial disparities, white flight, public safety, housing, and economic development as we grapple with legitimate, thoughtful ways of making positive change. We'll learn how to listen to, understand, and address conflicting voices. Readings, speakers, site visits, films, and other materials will be combined with discussion, writing, and socially conscious engagement as we seek to understand the many faces of Ferguson while following contemporary developments as they occur. Professor Robert Hansman acts as advisor and guide. The interdisciplinary course he developed over many years, “Community Building/Building Community,” provides the intellectual, ethical, and spiritual bases for the course. This course offers fresh perspectives and provides unique opportunities for community engagement for students who have previously taken Community Building; however that course is not a prerequisite. Projects develop collaboratively and organically between students, faculty, and community partners working to find common values and beliefs upon which to build concrete, meaningful action. CET (https://gephardtinstitute.wustl.edu/for-faculty-and-staff/community-engaged-teaching/) course.

Same as X10 XCORE 308X

Credit 3 units.

A46 ARCH 311 Architectural Design I
This architectural design studio is a final course in the five-semester core studio sequence. It focuses on rigorous design development, from a conceptual exploration of an idea to a detailed building design. Prerequisites: successful completion of the four-semester core design studio sequence, including Arch 212B, with a grade of C- or better. Concurrent registration in Building Systems I required.

Credit 6 units.

A46 ARCH 312 Architectural Design II
Prerequisite: satisfactory completion of Arch 311.

Credit 6 units.

A46 ARCH 312A Architectural Design II (Study Abroad)
Prerequisite: satisfactory completion of Arch 311.

Credit 6 units.

A46 ARCH 316F Re-Discover the Child
It is said that, at this time in history, the entire country must make a commitment to improve the positive possibilities of education. We must work to lift people who are underserved; we must expand the range of abilities for those who are caught in only one kind of training; and we must each learn to be creative thinkers contributing our abilities to many sectors of our society. In this course, we will expand our views about learning by experimenting with the creative process of lateral thinking. We will learn about learning by meeting with some brilliant people at the university and in the St. Louis community who are exceptional in the scholarly, professional, and civic engagement work they are accomplishing. We will learn about learning by working in teams to develop exciting curriculum (based upon the knowledge and passion that students bring from their academic studies and range of interests) for middle-school students from economically disadvantaged urban families. Each week of the semester, we will learn about learning by providing one-hour 2D and 3D hands-on problem-solving workshops for middle-school students at the Compton-Drew Middle School, which is adjacent to the Science Center in the city of St. Louis. Students and their Washington University teammates will implement the workshops they create throughout the semester for a group of six to eight Compton-Drew Middle School students. In this course, we celebrate the choices of the studies we each pursue, and we expand our experience in learning from each other's knowledge bases and from each person's particular creativity in the area of problem solving. This course seeks students from all disciplines and schools, from first-year students through seniors.

Credit 3 units. Art: CPSC

A46 ARCH 316T Printmaking for Architecture and Art Students
This course will focus on monotype mixed media printmaking using both a press and digital print processes. The course is designed to be responsive to current issues with a focus on contemporary printmaking practices and various ideas about dissemination in the age of social media. The course will include an examination of historical examples of diverse global practices; prints made in periods of uncertainty, disruption, war, and disaster; and speculative projects by architects such as Superstudio, Zaha Hadid Architects and Archigram. Students will be expected to create a series of work with a conceptual framework developing a personal visual language.

Same as F20 ART 316T.
and generate a relationship between space and form. The discipline, accuracy, and visual intelligence to conceptualize in architecture. The objective is to develop the requisite representation, specifically the systems of drawing used in this course examines the history/theory and practice of architectural design, focusing on conceptual, theoretical, and tectonic principles. For first-semester MArch 3 students only. Credit 6 units.

A46 ARCH 317 Architectural Design I (MArch 3)
The first of a three-semester sequence that introduces students to architectural design, focusing on conceptual, theoretical, and tectonic principles. Enrollment is open to first-semester MArch 3 students only. Credit 9 units.

A46 ARCH 317M Architecture Through the Photographic Lens
Same as F20 117M, 217M, 417M - Juniors (only) register for F20 317M. Photography offers ways of seeing and representing the world around us. This course provides technical and conceptual frameworks for understanding architectural space as seen through the camera. Topics include building as site, landscape as context, and the architectural model as a representation tool. Students are introduced to a wide range of artists and architects, helping build a unique camera language to support their individual projects. Students will learn DSLR camera basics, fundamentals of Photoshop, digital printing techniques and studio lighting for documenting architectural models. The course assumes no prior experience with digital imaging technologies or materials. Digital camera required. Same as F20 ART 317M Credit 3 units. Art: FAAM

A46 ARCH 318 Architectural Design II (MArch 3)
The second of a three-semester sequence of design studios. This course continues the examination of issues raised in Arch 317. For second-semester MArch 3 students only. Credit 6 units.

A46 ARCH 318A Architectural Design II (MArch 3)
The second of a three-semester sequence of core design studios, which continues the examination of issues raised in ARCH 317. Enrollment is open to second-semester MArch 3 students only. Credit 9 units.

A46 ARCH 323A Architectural Representation I (MArch 3)
This course examines the history/theory and practice of representation, specifically the systems of drawing used in architecture. The objective is to develop the requisite discipline, accuracy, and visual intelligence to conceptualize and generate a relationship between space and form. The course focuses on two concurrent tasks: first to outline and analyze the historical development of representational logics and their impact on architectural ideation, and second to explain the codification and usage of specific geometries, including orthographic and isometric projection, central and parallel perspective, and architectural axonometric. We will see that, rather than a translation of reality, representation operates between perception and cognition as a transcription of reality and is thus a powerful instrument in the design and making of architecture. The relationship between the drawing forms and the tools used to produce them are brought into focus as manual, digital, photographic and physical applications driven by drawing intentions. The course is organized as a lecture/lab with emphasis on practice of manual and photographic applications. Credit 3 units.

A46 ARCH 323B Architectural Representation II (MArch 3)
The course examines the history/theory and practice of representation, specifically the systems of drawing used in architecture. The objective is to develop the requisite discipline, accuracy and visual intelligence to conceptualize and generate a relationship between space and form. The course focuses on two concurrent tasks: first, to outline and analyze the historical development of representational logics and their impact on architectural ideation, and second, to explain the codification and usage of specific geometries, including orthographic and isometric projection, central and parallel perspective, and architectural axonometric. We see that, rather than a translation of reality, representation operates between perception and cognition as a transcription of reality and is a powerful instrument in the design and making of architecture. The relationship between the drawing forms and the tools used to produce them are brought into focus as manual, digital, photographic and physical applications driven by drawing intentions. This course is organized as a lecture/lab with emphasis on the practice of digital media and physical modeling. Emphasis is on participation and excessive absences are noted. Please note: The second half of the semester focuses on computing, for which each student is required to have a laptop computer. Credit 3 units.

A46 ARCH 326G Digital Fabrications
This course will focus on fabrications both real and virtual. The ubiquity of computers in design, studio art, communications, construction and fabrication demand that professionals become comfortable with their use. It is also important in a group of ever-specializing fields that one knows how to translate between different software and output platforms. This comfort and the ability to translate between platforms allow contemporary artists and designers to fabricate with ever-increasing freedom and precision. This course will introduce students to 3D software with a focus on 2D, 3D, and physical output. Through a series of projects, students will learn to generate work directly from the computer and translate it into different types of output. Starting from first principles, this course will cover the basics from interface to output for each platform used. This course will also familiarize students with a range of CNC technology and other digital output for both small- and large-scale fabrication. The course will be broken into three projects. In the first project, students will focus on computer-generated geometry and control systems. In the second part, students will generate physical output and line drawings. The final project will focus on rendering, context and cinematic effects. The software covered in this course includes, but is not limited to: Rhinoceros 3D, Maya, Illustrator, Photoshop. Additionally, students will use the 3D printer, laser cutter, and/or other digital output tools. Credit 3 units.
A46 ARCH 327X Color Systems
This course is a sustained investigation of color. Students study how color is affected by light, by space, by arrangement, by culture, and by commerce. The course aims to deepen the understanding of color’s complexity and pervasiveness as a fundamental element of shared visual culture. The course develops both technical and conceptual skills to aid in visual translation. In addition to color-specific inquiry, a goal is to expand ideas of research and enable students to integrate various methods of acquiring knowledge into their art and design practice. Throughout the course, students discuss various processes of making/construction, the connection between color/form/concept, and strategies for idea generation and brainstorming. The course allows for much individual freedom and flexibility within varying project parameters. College of Architecture and College of Art sophomores, juniors, and seniors have priority. Fulfills Sam Fox Commons requirement. Prerequisite: Drawing I, Communication Design I, or 2D Design, or permission of instructor. Same as X10 XCORE 327X Credit 3 units. Art: FADM EN: H

A46 ARCH 3280 Architectural History I: Antiquity to Baroque
This lecture course will introduce major historical narratives, themes, sites, and architects from ancient Greece to the end of the Baroque period. We will take an extended look at the dawn of the modern period during the 15th and 16th centuries through a global perspective, turning eastward from Renaissance Europe to the Ottoman, Mughal, Chinese, and Japanese empires. The great chronological and geographic span of this course will be pulled together around the themes of classicism and its subsequent reinterpretations as well as the pursuit of the tectonic ideal. Our aim is to recognize how these ideological pursuits of modern architecture evolved out of longer historical processes. We will also pay close attention to major sites of landscape and urban-scale work. Requirements will include a midterm exam, a final exam, and a series of short papers. Credit 3 units.

A46 ARCH 3284 Architectural History II: Architecture Since 1880
An introductory survey of the history and theory of architecture and urbanism in the context of the rapidly changing technological and social circumstances of the past 120 years. In addition to tracing the usual history of modern architecture, this course also emphasizes understanding of the formal, philosophical, social, technical and economic background of other important architectural directions in a global context. Topics range from architects’ responses to new conditions in the rapidly developing cities of the later 19th century, through early 20th-century theories of perception and social engagement, to recent efforts to find new bases for architectural interventions in the contemporary metropolis. Credit 3 units. Arch: HT EN: H

A46 ARCH 330A Special Topics: Florence (Study Abroad)
A study-abroad seminar providing an in-depth and in-situ exploration of architecture and urbanism in Italy. Credit 3 units.

A46 ARCH 331A Experimental Formwork
Our perception of concrete is typically determined by the mold that gives it its shape and not the material itself. Given the fluidity of the material in its plastic state, the desired morphology and configuration once cured relies on its molding possibilities. During this seminar students will explore the essence of mold making, its possibilities and limitations as containers of a fluid material that will determine its final shape and surface quality. Starting from an understanding of standard molding procedures, students will explore a wide range of non-conventional formwork techniques such as flexible fabric, pneumatic, 3d printing, dynamic casting, rotomolding and others. Students will produce physical molds and cast prototypes in concrete or other materials through a process of experimentation and discovery. The ultimate goal of this course is to use formwork as an active and accessible design tool and fertile ground for innovation. Particular emphasis will be on discovering relationships between material properties and production methods as a
way of finding systematic approaches that can lead to making prototypes combining digital and/or analog tools. Students are expected to develop creative processes that can be applicable to unprecedented and novel casting techniques and potentially to manufacturing methods of actual building components. The course is structured around an initial lecture about mold making precedents and possibilities, specific readings, a short research on traditional and other current -non-traditional- mold techniques and hands-on work. Students will work individually to fabricate small mold prototypes (6" x 6" x 6"), cast concrete or other fluid materials readily available to perform tests and produce accurate representation of the outcomes and its process. The course is open to undergraduate and graduate students.

Credit 1.5 units.

A46 ARCH 332A 1 House

In this seminar, students will research and develop designs for a completely off-the-grid "small" house in Boquete, Panama, for Kaylee and Jordan of the Nomadic Movement YouTube channel. With input from Kaylee, Jordan, and their crew, students will research traditional sustainable building practices in Panama and develop schematic designs for a small house to be built by them on their property in Boquete, with construction beginning in May 2021. The course will include instruction in residential design, structure, and materials and methods of construction. A subtext of the course will be entrepreneurship and beginning one's practice as an architect. To this end, students will be asked to write a prospectus for their architectural practice, including naming, branding, and producing their first YouTube video.

Credit 3 units.

A46 ARCH 333 Case Studies in 20th-Century Architecture

Through a series of analytical, critical and interpretative studies of singular works of architecture in the 20th century, this course focuses on the manifold processes and contexts of their production. Each work is examined as a physical and cultural artifact with precise formal, intellectual and ideological intentions and meanings. The architectural object, understood as a synthesis of multiple criteria and frameworks, is explored from its conception through its realization based on certain principles (fundamental precepts of the discipline of architecture) and a broad range of concepts (abstract ideas understood as the products of speculative and reflective thought).

Credit 3 units. Arch: GARW

A46 ARCH 336D Biomimicry: A Biokinetic Approach to Sustain(Able) Design

There is a conceptual similarity between the way an organism and a building engage their respective environments. A biological system responds to the unique condition of its ecosystem; architecture responds to the unique conditions of the site. Building on this principle are the fields of biomimicry, the study of design and process in nature, and biokinetcs, the study of movement within organisms, and their ability to address architectural problems with elegant, technologically advanced, sustainable solutions. Biomimicry: A Biokinetic Approach to Sustain(Able) Design focuses on kinetics as an essential element of biomimicry in the context of architecture and employs the study of the kinetic aspects of biological systems — structure, function and movement — to inform the design and engineering of buildings. A systematic approach to researching and translating the kinetic function of organisms leads to a successful bridging of biological and architectural concepts.

Credit 3 units.

A46 ARCH 336E Biomimicry, Teleology and Organic Architecture

This seminar is intended to develop an understanding of the history and evolution of biomimicry as a significant design tool from the emergence of biology as a science in the early 19th century to the present. Biology was the first discipline to confront the problem of teleology, of design in nature. For the past 100 years, biological references and ideas are present in the work of architects and in the writings of architectural theorists. Biomimicry, a term coined by Janine Benyus, has developed into a new discipline that studies well-adapted organisms' designs and processes and then imitates life's genius to design human applications, aiming at a sustainable development. The intent of this seminar is to establish a systematic approach to research and analysis of the history and theory of this biological analogy and its influence on the history of environmental architecture, as seen through the lens of biomimicry. In addition to a historical analysis, students analyze case studies that exemplify the relationship of architecture to biology, focusing not only on built work, but on the writings and the designer's positions in terms of this relationship. Classes consist of a combination of formal lectures and facilitated discussion periods. In addition, each student chooses a particular architect and, through research and analysis, assesses the influence of biomimicry in their work and presents these results in a paper that includes a critical analysis and a proposal on how to advance the architect's work to the highest level of biomimicry.

Credit 3 units.

A46 ARCH 336F How to Improve Lives for People in Developing Countries

Washington University students from all disciplines will explore solutions to improving healthcare, education, food supply, and infrastructure for people living in Mali, Liberia, and the United States. Students in this course will work in collaboration with an architectural design studio; Washington University students will design a small rural hospital for rural Mali and Liberia and urban Mali and Liberia. The course will also foster an exchange of both ideas and information regarding the culture, customs, religion, craft, language, and history of Mali and Liberia. Each Thursday, WashU students from different fields of study will apply their discipline to the goal of designing and teaching hands-on problem solving projects for students at the University City Middle School. The theme for each project will be proposals for improving the lives of people living in Mali and Liberia. Gay Lorberbaum, with advising from University City administrators, will work individually with each WashU student and each WashU team to develop 3D hands-on problem solving curriculum for the University City Middle School students.

Credit 3 units.

A46 ARCH 339 Concepts and Principles of Architecture I

This weekly seminar course addresses issues of Western architectural thought through a focused series of readings and discussions. The necessity and role of architectural theory in general is examined. Issues of tectonics, historicism, typology, regionalism, modernism, postmodernism and other critical frameworks for the consideration of architecture are thematic subjects of discussion. Selected readings include Vitruvius, Alberti, Laugier, Semper, Ruskin, Le Corbusier, Gropius, Kahn, Rossi, Venturi, Eisenman, Libeskind and Koolhaas. Weekly
reading assignments, attendance, participation, one summary and discussion introduction based on a reading topic, final paper. Required for first-semester MArch 3 students. Fullfills history/ theory elective for MArch 2 students.
Credit 3 units. Arch: CAST, GACS

A46 ARCH 343A Design As Export
This course introduces students to the contemporary global characteristics of design in the late 20th and 21st century. The marketing, fabrication, distribution and consumption of design is global, yet the cultural and formal identity of most design products are national and regional. How do traditions of design and quality based on centuries of a national and regional design culture react and adapt to a global market? What is the culture of design? What is design identity? Italian design is the primary focus of this course, followed by Japanese and Asian design and manufacturing. Case studies include examples of industrial design, fashion design, communication design and automobile design. The course also includes presentations by design curators and representatives of various international design companies.
Credit 3 units.

A46 ARCH 343X Digital Filmmaking: City Stories
Digital Filmmaking: City Stories is a cross-university video art course for students interested in making short films through a transdisciplinary and time-based storytelling in both narrative and non-narrative formats. Whether documentary or abstract, individually produced or collaborative, all projects in this course have a required social and urban engagement component. In this course, the City becomes a laboratory for experimentation and contribution. Students meaningfully engage St. Louis, and their projects address sites of concern to explore the complex fabric of the city by way of framing and poetic juxtaposition. City Stories merges several arts and humanities disciplines, including experimental cinema and documentary journalism, and creates an opportunity for empathic listening and inquiry as students discover stories built from collective as well as individual memories. Same as X10 XCORE 343
Credit 3 units.

A46 ARCH 344A Body as Site: Jewelry Design as Architecture
In this course, students will undertake a 3D printing and casting process to realize an architecturally conceived set of jewelry in metal and create drawings and renderings of this set. Often, metal 3D printed parts are used as industrial components and engineered mechanical parts. This project will reverse that to create delicate objects that engage with skin. Students will create a parure (a set of related pieces of jewelry) that will examine the human body as an architectural site and test the potential of metal 3D printing in architecture. We will use Autodesk Maya to create hyper-articulated surfaces and employ lost wax and lost plastic metal casting, consequently blurring the line between traditional and contemporary techniques. As a result, we will not simply conceive of a project and outsource its production. Instead, we will use the foundry to provide firsthand experience with material processes. The set of pieces will share characteristics of form and geometry as well as tactics of physical interconnection with the human body, adjusting through site-specific responses to finger, wrist, neck, ear, or head. In addition to a set of renderings and drawings, students will produce wax hand-carved models and 3D-printed plastic objects for lost plastic casting. For artifacts that require fine detail, students will outsource their projects to wax 3D-printing and casting facilities. (Outsourcing for a typical ring costs approximately $15 in steel and $35 in silver. Total course costs are estimated to be $100.)
Credit 1.5 units.

A46 ARCH 345A The Corner Problem
The corner problem is a classic architectural challenge of how a material, pattern or system turns a corner. In particular, the class will focus on facades that include sun shading elements, thus increasing the thickness of the assembly. Turning a corner sounds benign until you consider that all materials have thickness, and then the problem reveals itself. This too often results in an oversimplification and thus reduction of the design intent. This course will focus on designing custom facade systems using advanced digital modeling techniques and testing through physical prototypes. Knowledge of material systems and modeling techniques will be supplemented through discussions with industry leaders in facade design and fabrication.
Credit 1.5 units.

A46 ARCH 346X Shopping
This seminar examines shopping as a social and cultural construct that operates at several levels in relation to art, architecture, and urban planning. Shopping is the fundamental activity of the capitalist marketplace. It is also inextricably linked with major aspects of public and foreign policy, where national consumerism is closely linked to global tourism and it is at the core of economic development. Shopping is as well a common denominator of popular culture, frequently satirized in contemporary art, film, and literature. Participants in the seminar will read selections from various writings about shopping and the marketplace. We will also view several films examining the shopping environment in narratives of power and desire. Prerequisite is completion of Sam Fox foundations year. Open to sophomores and above.
Same as X10 XCORE 346X
Credit 3 units. Art: CPSC

A46 ARCH 348A Body as Site: Jewelry Design as Architecture
In this course, students will undertake a 3D printing and casting process to realize an architecturally conceived set of jewelry in metal and create drawings and renderings of this set. Often, metal 3D printed parts are used as industrial components and engineered mechanical parts. This project will reverse that to create delicate objects that engage with skin. Students will create a parure (a set of related pieces of jewelry) that will examine the human body as an architectural site and test the potential of metal 3D printing in architecture. We will use Autodesk Maya to create hyper-articulated surfaces and employ lost wax and lost plastic metal casting, consequently blurring the line between traditional and contemporary techniques. As a result, we will not simply conceive of a project and outsource its production. Instead, we will use the foundry to provide firsthand experience with material processes. The set of pieces will share characteristics of form and geometry as well as tactics of physical interconnection with the human body, adjusting through site-specific responses to finger, wrist, neck, ear, or head. In addition to a set of renderings and drawings, students will produce wax hand-carved models and 3D-printed plastic objects for lost plastic casting. For artifacts that require fine detail, students will outsource their projects to wax 3D-printing and casting facilities. (Outsourcing for a typical ring costs approximately $15 in steel and $35 in silver. Total course costs are estimated to be $100.)
Credit 1.5 units.

A46 ARCH 349D Digital Filmmaking: City Stories
Digital Filmmaking: City Stories is a cross-university video art course for students interested in making short films through a transdisciplinary and time-based storytelling in both narrative and non-narrative formats. Whether documentary or abstract, individually produced or collaborative, all projects in this course have a required social and urban engagement component. In this course, the City becomes a laboratory for experimentation and contribution. Students meaningfully engage St. Louis, and their projects address sites of concern to explore the complex fabric of the city by way of framing and poetic juxtaposition. City Stories merges several arts and humanities disciplines, including experimental cinema and documentary journalism, and creates an opportunity for empathic listening and inquiry as students discover stories built from collective as well as individual memories. Same as X10 XCORE 349 D
Credit 3 units. EN: H
A46 ARCH 348B Furniture
This seminar will explore the work of the Italian architect Enzo Mari, with a focus on his autoproggettazione? furniture and book project of 1974. The book offers free designs of furniture that can be built with only a few tools, simple materials, and basic skills, such as measuring, cutting, and hammering. In 2015, Mari granted the Berlin-based CUCULA: Refugees Company for Crafts and Design the rights to redesign and sell the furniture. Students will take up this charge and redesign the furniture from autoproggettazione? again, with each student building a redesigned chair. Please note that this seminar will require students to acquire the following tools: a measuring tape, a hammer, a hand saw, and a hand drill and bits (approximate cost of $75.00 new, $25.00 if the student is resourceful). (The professor will contact the student in 25 years and ask if they still have the tools.)
Credit 1.5 units.

A46 ARCH 350 Service Learning Course: Environmental Issues
This service learning experience allows Washington University students to bring their knowledge and creativity about the many subjects they are studying to students at the Compton-Drew Middle School, adjacent to the Science Center, in the City of St. Louis. This course is for arts and sciences students of differing majors and minors, business, architecture and art students, and engineering students from all engineering departments. In the first third of the semester, students will: 1) begin learning the creative process of lateral thinking (synthesizing many variables, working in cycles); 2) work with a teammate to experiment with the design of 2D and 3D hands-on problem-solving workshops about exciting environmental issues, for small groups of students at Compton-Drew Middle School; 3) devise investigations for the workshops about environmental issues embracing the sciences, the humanities and the community; 4) work with the professor individually and in their team, as well as seek advice of faculty from a specific discipline throughout the semester in the preparation of their evolving curricular plan. During the last two-thirds of the semester, Washington University students will be on-site during the Compton-Drew school day, once a week on each Monday from 12:00 to 1:30 p.m. to teach small group workshops for some of the sixth- and seventh-grade students. There will also be a one-hour class meeting on Wednesday at a time to be finalized later, CET (https://gephardtinstitute.wustl.edu/for-faculty-and-staff/community-engaged-teaching/) course.
Credit 3 units. Art: CPSC

A46 ARCH 355 Interdisciplinary Ecosystems Principles Integration
The mission of this interdisciplinary seminar class is to “advance interrelationships of ecological and human systems toward creating healthy, resilient, and biodiverse urban environments” and will bring together experts and students in ecology, urban design, architecture/landscape architecture, economics, social work, and engineering, drawing from inside and outside the Washington University community.
Credit 1 unit. Art: CPSC

A46 ARCH 376 Design Thinking for Science, Engineering, Business and the Liberal Arts
This introductory course outlines strategies and methodologies drawn from a wide range of creative design practices, including architecture, landscape architecture, urban design, industrial design and others. The course explores how these ideas and techniques are similar to practices in science, engineering, business and the liberal arts and how they might be applicable to multidisciplinary problem solving. Topics include perception, representation, technology, group intelligence, bio-mimicry and context-based learning, among others. Emphasis is given to the intersection of design thinking with environmental problems and the relationship between design thinking and innovation. The course includes lectures, guest lectures with case studies, and design projects. Open to all undergraduate students.
Credit 1 unit. EN: H

A46 ARCH 3823 15th- & 16th-Century Florence, Rome & Venice: Rethinking Renaissance Visual Culture
The Early Renaissance — also known as the quattrocento — usually denotes the period from circa 1400 to circa 1500. In those 100 years, Italy, particularly Florence, witnessed an extraordinary coming together of artistic talent, a passionate interest in the art and culture of Greek and Roman antiquity, a fierce sense of civic pride and an optimistic belief in the classical concept of “Man as the measure of all things.” This course examines the principal artists who contributed to this cultural revolution. In order to take full advantage of the special experience of studying the renaissance in the very city of its birth, the stress is mainly, although not exclusively, on Florentine artists who include sculptors such as Donatello, Verrocchio, and Michelangelo; painters such as Giotto, Masaccio, Uccello, Botticelli, Leonardo, and Raphael; and architects such as Brunelleschi and Alberti up to Sangallo.
Same as F20 ART 3823
Credit 3 units. Arch: HT, RW Art: AH

A46 ARCH 3824 The Italian Renaissance in the City of Florence
This course encompasses the Renaissance from Giotto through the High Renaissance. Students examine first-hand the works they are studying. Included are field trips to Rome and Venice. Same as F20 ART 3824
Credit 3 units. Art: AH EN: H

A46 ARCH 3825 Florence as a Cultural Artifact: The History of Architecture as the History of the City
This course combines seminar and workshop activities aimed at the understanding of the rich urban and architectural history of Florence, the place of students’ work and temporary living during the study abroad program. These activities will be in dialogue with the design studio and art history courses. The intellectual framework of the course is informed by Giulio Carlo Argan’s seminal work “La storia dell’arte come storia della città” (“The history of art as the history of the city,” Einaudi, 1983), presenting the city as a complex time-space phenomenology of cultural artifacts. While Florence is well known for its cultural contribution to Western cultural history during the 1400s and 1500s, little is known about the full span of its millennial history, including its contemporary developments. The seminar activities will cover such aspects through readings and lecture-cum-
A46 ARCH 382S Special Topics: Franco Albini and Carlo Scarpa (Study Abroad)
A history/theory seminar course examining the works of the Italian architects Franco Albini (b. 1905, Robbiate [Milan] - 1977) and Carlo Scarpa (b. 1906, Venice - 1978), as well as "the school of Florence," a group of modern architects who worked primarily in and around Florence, Italy, including Leonardo Savioli (b. 1917, Florence - 1982), Giovanni Michelucci (b. 1899, Pistoia - 1990) and Leonardo Ricci (b. 1918, Rome - 1994). Introductory lectures by the professors will be followed by student research and case studies of selected buildings and projects. Students will participate in field trips conducted by the professors to buildings and sites in and around Florence (works of Savioli, Ricci, Michelucci and Scarpa). A field trip to Milan in the first half of the semester will include visits to the Franco Albini Foundation with a lecture by the architect Marco Albini, as well as several exhibition installations designed by Albini, and his contemporaries Belgiojoso, Peresutti and Rogers. A field trip to Venice, Vicenza and Verona in the second half of the semester will include visits to projects designed by Scarpa, including the Olivetti Showroom, Querini Stampalia, Correr Museum, Castelvecchio Museum, and the Banca Popolare di Verona. Students will analyze and present buildings and installations employing varying methods of analysis, both graphic and photographic.
Credit 3 units. Arch: HT

A46 ARCH 385B Beyond Words, Beyond Images: Representation After History
The seminar focuses on art in the public domain and examines contemporary practices that engage public memory and the metacity. Prompting students to consider their own practice in the context of public space, this seminar offers examples of projects that contribute to the global cultural and political discourse. Weekly illustrated lectures, readings, writing assignments, screenings, discussions, and individual research lead toward the final term paper. Individual studio consultations serve as a platform for the discussion of student's evolving practice, which culminates in a final project in a medium of choice. MFA VA students and graduate students in architecture are especially welcome.
Credit 3 units.

A46 ARCH 386X Public Practice
With architecture, art and design students in mind, Public Practice is a design-build course focused on the development, presentation, and actualization of commissioned works within the public realm. Through an iterative process of concept development, material exploration, and panel reviews, students will learn how to develop, propose and execute a viable public piece. Individual and/or group proposals will be presented before a selection committee in consideration toward a public art/design commission. Selected projects will be realized within specified sites in the community of University City, MO. Students will have hands-on experiences with construction processes, meeting structural requirements and codes, site development, and project installation, which will prepare them for a creative life situated firmly within a discourse of Public Space. Open to MFA, graduate architecture students, BFA and undergraduate architecture students with junior-level standing. Minors and others eligible with consent of instructor.
Same as X10 XCORE 386X
Credit 3 units.

A46 ARCH 388A Architecture Portfolio Design
Architecture portfolios play an essential role in framing and presenting work in both academic and professional contexts. More importantly, through the reflective act of re-presenting images and texts, students can begin to define their positions in the field and direct the course of their careers as architects. Architecture Portfolio Design facilitates the production and development of a comprehensive portfolio and covers the essential concepts and techniques at play in contemporary portfolio production. Over the course of 8-weeks, we will do the following: 1) perform close analyses of groundbreaking architectural publication designs; 2) assemble, organize, and evaluate portfolio image and text content; 3) profile the key academic institutions and employers with which students are most interested in engaging; 4) define the target audience to better frame content for that audience; 5) review portfolio organization as well as page layout and hierarchy of image and text; 6) perform an intensive review of student written project descriptions and related captions; 7) review tactics of digital display and physical distribution; 8) invite widely published architects and graphic designers in the Sam Fox School to portfolio reviews; 9) invite a panel of students that have prepared successful portfolios to present and share strategies; and 10) tangentially address curriculum vitae, work samples, web and social media accounts, reference letter requests, essays, and letters of intent.
Credit 1.5 units.

A46 ARCH 396B Making Things That Function
Heidegger identified "things" as what objects become once they cease to perform their function in society. In this course, we seize that moment of dysfunction as a point for creative intervention. Students will design and make functional objects that engage the body with intention. The meaning of function will be debated so that students develop a definition based on their own values. Highly exaggerated, specific, or experimental works will be encouraged. Techniques for metal fabrication, simple woodworking, and mold-making will be taught in class, as needed. No previous experience is necessary. This course will benefit designers, artists, architects, and engineers, and it will explore the intersections of design and making among these fields. Prerequisite: 3D Design, Architecture 111 studio, or permission of instructor.
Same as F20 ART 396B
Credit 3 units. Art: FAAM, FADM

A46 ARCH 400A Design Foundations Studio
This is an intensive three-week program that introduces incoming students to the pedagogy around thinking and making through an introductory studio exercise. Enrollment is open to first-semester MArch 2 students only.
Credit 3 units.
A46 ARCH 401B Color in Architecture, Design and Art
This seminar introduces students to aspects of color in architecture, design and art and deals primarily with 19th-, 20th- and 21st-century theories and projects. Student work includes readings and discussions, case studies and experiments in color application. Research includes case study architectural examples by Rietveld, Herzog & De Meuron, Luis Barragan, SANAA and others; readings on color theory by architects Alberti, Fernand Leger, Koolhaas, Le Corbusier; artists Mondrian, Josef Albers, Richard Paul Loesel, Ad Reinhardt, Barnett Newman, Donald Judd; philosophers Goethe, Wittgenstein, Barthes; psychologists Carl Jung, and designers Irma Boom, Ettore Sottsass, Bruno Munari and Konstantic Grcic. Resources will include the collections of the Mildred Lane Kemper Art Museum and the Saint Louis Art Museum.
Credit 3 units.

A46 ARCH 402A Measured Representation
This course proposes to investigate and create a series of measured drawings. The drawings, as architectural objects, configure architectural knowledge, perception and vision. We will begin by studying precedent drawings in relation to each architect's theoretical framework, project description and technique. The range of works will relate different types of construction (perspectives, axonometrics, diagrams, ideagrams, assemblages, montages, descriptive geometry, and mapping) with integral and symbiotic theoretical agendas. Each student will learn the techniques of representation in their case study and from this example construct an interpretation of a specified site in this language. With a collection of theoretical frameworks and workshops on various techniques, the class will qualify a series of sites through drawing interpreting the shadows present. Shadows may be thought of as reductions of the real object — in this sense, the drawings will act as abstractions or reductions that promote vision. Instead of simply discussing qualities of space, narratives of metaphor, intangible phenomena, implications of constructed geometry, this architectural research project attempts to propose methods of seeing such that the representation may play a more active role in the shaping of design. This course centers on the creation of imaginative processes of representation.
Credit 3 units.

A46 ARCH 404 Advancing Integrated Sustainability
Do you want to work differently? Toward more effective outcomes? This course is a call to students from all disciplines with the conviction that it is necessary for us to work together while contributing from our specific fields of study to find solutions to challenges in our built environment. Students apply the knowledge base they acquire in this course to formulating ideas for actual community projects in St. Louis. Students learn to integrate and apply a holistic range of social, economic and technical systems inspired and optimized by models in the natural world. A foundation in natural and biomimetic systems is overlaid with analysis of corporate mission, principles and triple bottom-line thinking in order to learn how to build defensible, value-based arguments for implementation of sustainable systems. With the expressed intent of achieving net positive outcomes in the built environment, the following topics are addressed: brownfield property reuse; storm/wastewater management; urban heat island management; air quality; potable water issues and opportunities; material cycles and flows including embedded energy, emissions, toxicity, virgin vs. recycled content and waste diversion; energy efficiency and renewable energy opportunities; transportation, accessibility and mobility choices; vernacular and cultural expression; local and healthy food availability; fitness advocacy and other health issues; education; public outreach and transparency; governance; and the economics of these systems. Lectures, case studies, readings and class discussions support application exercises and experimental projects to propose ideas for improving the built environment at multiple scales. Assignments are reviewed often to assist each student's learning and questions. Complementing leading-edge theory with practical outcomes are provided with the intention that students develop valuable skills to be incorporated in their other academic projects. Please visit http://samfoxschool.wustl.edu for work samples and student manifestos from previous classes.
Credit 3 units.

A46 ARCH 404C Topics in Architectural Entrepreneurship
Entrepreneurship has become a very important issue for businesses small and large. What can the profession of architecture learn from these ideas? This course, offered in partnership with the Skandalaris Center for Entrepreneurial Studies, offers students a chance to gain exposure to the entrepreneurial ideas that are innovating the architectural community, and begin to foster a mindset of architectural entrepreneurship that has the potential to be widely beneficial to the profession. Each week the course welcomes a guest speaker who, as the owner of a firm or innovator of a new business proposal in the design field, provides case studies to show students what type of entrepreneurial ideas are shifting the architectural discipline. From sustainability, to urbanization and localism, to emerging global growth engines, and the future structure of the architectural network, each lecturer brings new insight to what it is to be an architectural entrepreneur.
Credit 3 units.

A46 ARCH 404D For Purpose: Art & Design as an Ethics-Based Model of Entrepreneurship
Working from the premise that art and design have the ability to enrich and transform lives and communities in a tangible way, students redefine social, environmental and cultural problems as opportunities. Students are encouraged to bring ideas that have the potential to address these problems through the creative processes of art and design. Students work in teams to develop a proposal for a project, product, or service-based organization with the potential to address a specific issue. Students draw lessons from researching established individuals, companies and not-for-profit organizations that are involved in the production of culturally significant, creative work that also supports a larger social mission, and students apply this research to their own proposal. Each proposal is developed into a business sustainability plan that demonstrates the value of the proposal and explains the resources required to meet specific goals. This course introduces students to the uncertainty that is inherent in the entrepreneurial process. Students work to develop skills to evaluate ideas in relation to their personal values, the idea's ability to address a specific problem, and the resources required to implement a sustainable solution. The process helps students navigate the uncertainty and assess the risk associated with implementing their proposal through morphing the idea concept, seeking advice, and building a coalition of stakeholders. This course is open to disciplines outside of architecture. Students in Art, Social Work and Engineering are encouraged to register.
Credit 3 units.
A46 ARCH 404E Design: Urban Ecosystem Principles Integration
In today's world, our discipline has grand challenges whose solutions often lay in other realms. How will students train themselves to leverage the interdisciplinary partnerships required to innovatively solve and evolve in a rapidly changing world? The mission of this interdisciplinary course is to "advance the interrelationships of ecological and human systems toward creating a healthy, resilient, and biodiverse urban environment" and brings together experts and students in ecology, urban design, architecture/landscape architecture, economics, social work and engineering, drawing from inside and outside the Washington University community. Building from our knowledge of ecosystem principles and function, a diverse group of leaders in their fields provides lectures, readings, and student project leadership to understand and test Healthy Urban Ecosystems Principles among human and ecological (nonhuman) systems and the range of sociopolitical processes entailed with their implementation. Class content is developed by Washington University leaders in their disciplines as well as external organizations such as the Missouri Botanical Garden, the Field Museum in Chicago, and others. This course builds upon a 1-unit fall seminar (not a prerequisite) that introduces challenges and solutions to achieving healthy urban ecosystems, and provides students an opportunity to more deeply engage and manipulate the interrelationships of symbiotic urban systems and apply those concepts in multidisciplinary project applications. Projects leverage student-defined challenges in the evolving laboratory of urban St. Louis using Healthy Urban Ecosystems Principles to develop multidisciplinary integrated solutions to challenges encountered in urban areas such as climate change and resilience, security of ecosystem services, social inequity, economic strife, and community vitality. Students present their work in a public forum at semester's end. CET (https://gephardtinstitute.wustl.edu/for-faculty-and-staff/community-engaged-teaching/) course. Same as ISO INTER D 406
Credit 3 units. A&S IQ: SSC Arch: SSC Art: CPSC, SSC EN: S

A46 ARCH 405D Furniture Design
The course focuses on the design of tables using wood as the primary material in response to "rational and irrational strategies" (systematic and emotional). Each student designs, develops and builds prototypes of two tables using the same material. One table is the product of a systematic analysis of material qualities, production procedures and other constructivist principles. The other table is the product of more explicitly intuitive, emotional and interpretive responses to the nature of the material and its production. Course limited to 10 students. Credit 3 units.

A46 ARCH 405H Sustainability Exchange: Community and University Practicums
The Sustainability Exchange engages interdisciplinary teams of students to tackle real-world energy, environmental, and sustainability problems through an experiential form of education. Students participate in projects with on- or off-campus clients developed with and guided by faculty advisors from across the University. Teams deliver to their clients an end-product that explores "wicked" problems requiring innovative methods and solutions. Past projects have included investigating soil impacts of de-icing practices on campus, collecting data on inequitable trash collection in neighborhoods, working with St. Louis City’s building division to make buildings more energy efficient, developing an understanding of how buildings impact birds on campus, and analyzing the performance and viability of sustainable investments. Upcoming projects are still being finalized and may include mitigating plastic pollution in the Mississippi, creating and publishing an illustrated book on the social, cultural, and ecological importance of Forest Park, and assisting with the planning and development of a rain-scaping proposal for a St. Louis City neighborhood. Team-based projects are complemented by seminars that explore problem solving strategies and methodologies drawn from a wide range of creative practices, including design, engineering, and science, as well as contemporary topics in energy, environment, and sustainability. Students will draw on these topics to influence their projects. The course is designed primarily for undergraduates, with preference given to seniors. Same as ISO INTER D 405
Credit 3 units. A&S IQ: SSC Arch: SSC Art: CPSC, SSC EN: S

A46 ARCH 407A Digital and Analog Fabrication
Digital and Analog Fabrication (Aperture Systems) explores contemporary fabrication methods for architectural design. We will develop and employ digital and manual fabrication techniques, including casting, thermoforming, 3D printing, laser-cutting, and CNC milling, for a semester-long design project. Students will have opportunities to work with a variety of tools in the shops and digital laboratories of full-scale kinetic prototype of/for a door/window/portal/aperture system. No previous fabrication experience or expertise is required. Credit 3 units.

A46 ARCH 407B Dynamic Materialism and Urbanism
Dynamic Materialism and Urbanism is a course developed for students who are interested in emerging technologies and digital production. The course develops and tests experimental design processes in architecture and digital media by enhancing 3D technologies, and it allows each student to adopt abstract thinking and making processes. This course develops digital design skills with the conceptual understanding of the transformative awareness of the artistic production of computational processes, which can inspire new forms of architectural conditions. The current developments in digital technology allow mathematical expressions to transform complex generative systems, which have shifted the formal discourse of architecture. The new digitally based techniques are being invented to inform creative processes in architecture through the manipulations of complex geometrical and topological forms. This course will focus on developing new techniques that translate these mathematical developments into diagrammatic design strategies. The generative modeling techniques will be deployed by the students for this investigation. Students will develop a complex set of massing strategies with conceptual development for defining and inventing dynamic-based architectural proposals within an urban context. Through digital modeling and mutating architectural strategies, each student will develop a transformational condition of a new emerging design. The new architectural forms are to be modeled through CAD/CAM (laser cutting) and rapid prototyping (3D printing) for physical outputs. Credit 3 units.
A46 ARCH 408A Digital Visualization Workshop: 2D Representation

This workshop is an introduction to basic AutoCAD drawing layout and organization with printing process. The workshop introduces students to importing and exporting into other graphic software (Photoshop and Illustrator) allowing a basic understanding of resolution and line types with articulated graphic awareness to develop complex 2D drawing capabilities. Required for all 317-level MArch 3 students, who are given priority in enrolling. Open to all other architecture students as space allows. Credit 1 unit.

A46 ARCH 408B Digital Visualization Workshop: Advanced 3D Modeling

This course develops digital design skills using the t-spline plug-in for Rhinoceros. As the field of architecture begins to incorporate evermore complex forms and formal strategies, it is necessary for designers to have the ability to work efficiently with advanced modeling software. This allows the development of clean fluid forms that can be manipulated and transformed as part of the design process, not merely as an output. The course breaks down into four three-hour sessions in which students will have three assignments designed to give a basic understanding of the t-spline plug-in, as well as to show how this type of form manipulation applies to the field of architecture. This course is required for all students in the core graduate program during 318 studio semester. Credit 1 unit.

A46 ARCH 408C Digital Visualization Workshop: Advanced Rendering

This workshop is an introduction to complex digital rendering in Rhino 4.0 with plug-ins Flamingo, VRay, Maxwell and Fry Rendering Engines. These skills are needed for sophisticated rendering outputs for more hyper-real visualization. The workshop introduces students to material, lighting, camera and global illumination processes. This workshop is required for all MArch students at the 419 level, who are given priority for registration in this course. Open to other upper-level undergraduate and graduate architecture students as space allows. Credit 1 unit.

A46 ARCH 408D BIM 101 Workshop

The future of the design and construction industry is going to be driven by the use of technology. The best example emerging today is the use of three-dimensional, intelligent design information, commonly referred to as Building Information Modeling (BIM). BIM is expected to drive the AEC industry toward a "model-based" process and gradually move the industry away from a "2D-based" process. The BIM 101 workshop is for future designers who recognize that this future is coming and who are looking for a way to begin preparing themselves in order to be ready when it arrives. We will explore how BIM is being used today and learn the basics of one of the leading BIM tools, Autodesk Revit Architecture 2009. This workshop is intended for senior undergraduate students and graduate students at the 500 level and above. Credit 1 unit.

A46 ARCH 408J Performance Enhancing

The term “performance” has many meanings that are either quantitative, qualitative, or both simultaneously through a range of design professions. The suggested goal of performance is an optimistic enhancement to a designed entity or idea and holds the potential to be highly provocative relative to the method it is deployed when arguing for a particular design procedure or effect. The double entendre suggested by the term performance relates to both how the system technologically improves a functional aspect along with a more theatrical act of performing. Design in both architecture and fashion relies on both interpretations to create a multidimensional discourse necessary to advance conceptual design investigation. The seminar class explores issues of performance of complex surfaces at the scale of the human body. The class consists of lectures, discussions, readings, physical material manipulation, and 3D digital modeling and digital fabrication. The use of Rhino (with T-splines and/or Grasshopper) or Maya is deployed for the digital design of the skin systems. Material systems are explored initially through manual experimentation and then combined with the digital investigation for the final digital fabrication using tools such as 3D printing, laser cutting, CNC milling, and thermoforming, resulting in a final garment for the human body. The class is offered to both fashion and architecture students and the investigations occur in teams of two where ideally one from each discipline is represented. Credit 3 units.

A46 ARCH 408M Atmospheric Animations

This course explores the capacity of modifying perception, as a way of thinking and making in design process. We recognize the ambient complex environment base on the concept of each element in space as a figure of motion, being sensitive to a specific period of time. Each student begins with selecting a certain way of observing, and developing a method to document and analyze a piece of dynamic perception which is then re-constructed through drawings or models, primarily focusing on one aspect of the experience, such as material performance, light reflections, air flow, etc. Final part of the project is representing the synthetic perception, by creating the atmospheric imagery in motion. Students are introduced to various techniques of recording ocular perceptions with the aid of digital tools, 2D representation, 3D modeling and animation rendering throughout the course, both as general workshops and individual project basis. Credit 3 units.

A46 ARCH 408N Mapping Complex Spatial Sequences

New methods of spatial practice have changed the way architects and designers work. As designers, we are no longer tied to static, projection-based drawings as a means to develop and represent our ideas. Time-based digital imaging allows us to simultaneously examine the narrative, formal, experiential and spatial aspects of a particular place. Students will map a site through digital photography focusing on a specific spatial sequence much like how a director would set up a scene, moving fluidly from one space to another. During the first half of the semester, this spatial sequence will be used to create a drawing of the entire site as one multilayered composite image with particular attention to the interaction of space, and movement. The site will then be reconstructed digitally through models or drawings, using the composite drawing as base. Finally, relationships between the drawing and model will be outlined resulting in a more complete experiential spatial sequence.
A46 ARCH 408P Building Performance for a Solar Powered House
We will study the state of the art of building integrated solar systems, and design such a system for a house and assess its performance using computational tools. Topics include the fundamentals of solar energy systems, energy management, and its implications to design, either passive or active approach. The course involves building performance simulations using Ecotect, Energy+, HERS and other tools. Students will use simulation data to study the relation between design and its performance. The course will consist of lectures, review, and student projects. The course will be parallel with several Engineering courses, including ESE 437: Sustainable Energy Systems, and EECE 428: Sustainability Exchange. Projects will involve teamwork with Engineering students of different backgrounds. The course will contribute to Team WUSTL solar decathlon with the following features: energy efficiency: passive design; high performance enclosure; net-zero energy; renewable energy; heat recovery; sustainability: water recycle; carbon neutral; lean construction; resilience: prefabricated house to mitigate natural disasters; Smartness: advanced sensors network; energy management; data visualization; human-centered living adaptability: flexible space; human comfort and perception controls to operate the house to improve productivity and health; an interdisciplinary effort for renewable energy and sustainable buildings.
Credit 3 units.

A46 ARCH 408Q Fabricated Drawings
The course will focus on digital fabrication tools, techniques and image theory to uncover new methods of producing physical images. Images are built in a myriad of methods including physical media or from data. Physical images, as defined in the context of this seminar, will transcend a 2D limitation to develop thickness. The increase to 2.5D or 3D opens opportunities to investigate the use of digital fabrication tools to construct images. In particular, the class will focus on the way information technology continues to have a profound effect on the way we perceive our built environment and the way we represent it. The images that surround us are becoming increasingly easy to generate through information technology. Access to technology both in terms of digital design and output affords the opportunity to reconceive the nature of images. Images are developed through analog, digital or hybrid processes. Their generation is a collaborative interaction between intuition and information processes through clearly defined rules. The scientific theoretician, Peter Galison, discusses the tension between intuition and information on the nature of images in the arts and sciences. Images reveal the intricacy of relations and knowledge, but they are simultaneous deceptive because they bypass the mathematics of pure science. The tension in the arts tends to be between the intuitive, interpretive ability of images as representation versus the image as evidence of a computation-based process. Architectural theoretician Mark Linder talks about how images in architecture are moving away from representations of something else toward a more literal and non-idealized result of a procedure. The image is literally the process of making visible the end result of an operation. Therefore, images are the evidence of the process by which they were generated. As such, the class will develop innovative processes for our digital fabrication equipment to construct images. The projects will develop new methods to use the CNC mill, laser cutters, knife plotter and 3D printer. New tools may need to be developed and built to enable the image fabrication process. In parallel with technological development is material experimentation. Students will be highly encouraged to test new materials to program their behavior and interaction with technology.
Credit 3 units.

A46 ARCH 409C Watercolor Painting for Architects, Urban Designers and Landscape Architects
This class will introduce students to different techniques of watercolor painting. The class will focus on teaching students the basics of material selection (paint colors, brushes, various papers), proper paint blending/mixing techniques, creation of unique color palettes, and both smooth wash techniques and painterly brush effects. Students will learn to render site plans of their own project work. There will also be an optional afternoon of pure sketching with paint. One objective is to teach students the methods to create beautiful renderings so that they may choose to apply the techniques to their final studio illustrative work (at the discretion of the student). Grades will be based upon class participation, effort, and final watercolors. Fulfills Analog elective requirement.
Credit 3 units.

A46 ARCH 409E Architectural Sketching
An introduction to architectural sketching — a graphic communication skill that architects and designers use to analyze and document their environments, and to visualize design thinking and creative process. Many class sessions will meet on site, drawing directly from observation. The first part of the semester will focus on fundamentals of sketching through the study of existing buildings, their contexts, and interiors. Students will expand and refine their observation skills as they use the architectural sketch as a mode of research — exploring elements of architecture: form, material, light; and the relationships between building and context, and building and interior. The second part of the semester will focus on the generation of new images through the architectural sketch as language. Students will learn to use the architectural sketch to explore, confront, develop, and translate abstract ideas into visual narrative, creating a record of design thinking and creative process. Students will be registered for the course from the waitlist by the Registrar’s Office. Priority will be given to undergraduate students. Prerequisite: Drawing I or graduate architecture standing.
Credit 3 units.

A46 ARCH 4102 Lively City: Behavioral Studies & Public Space Design
Working in small groups, students will acquire new perspectives and skills that put people and their needs at the heart of the creative process of re-imagining and transforming cities. Livability, lively cities, public life and other concepts describing inviting, vibrant and stimulating urban environments are frequently communicated in new visions for the future of cities today but are the most often unrealized component of design projects. This focus on “urban life” is a direct reaction to the urban realities created in the 20th century, where increases in our standards of living and the associated city-building processes have created areas in which large and increasing numbers of people have become isolated from each other, both socially and geographically. Despite our new awareness for the need to plan for a shared and intensified urban life in sustainable cities, we continue to have difficulty understanding exactly what this “urban life” is, how much of it we truly want and need, and how we can reconcile the often conflicting and
simultaneous needs of people for privacy and social stimulation. Open to all graduate students. Master of Urban Design students receive priority. The completion of both the Informal Cities (fall semester, 1 unit) and the Lively City (spring semester, 2 units) masterclasses may fulfill the Urban Issues elective requirement for MArch students. Same as A49 MUD 4102 Credit 2 units.

A46 ARCH 411 Architectural Design III
Prerequisite: satisfactory completion of Arch 312. Credit 6 units.

A46 ARCH 411A Architectural Design III (Study Abroad)
Prerequisite: satisfactory completion of Arch 411 for Bachelor of Design students. Satisfactory completion of Arch 312 for Bachelor of Science students. Twelve hours of studio work a week. Credit 6 units.

A46 ARCH 412 Architectural Design IV
Prerequisite: satisfactory completion of Arch 411. Credit 6 units.

A46 ARCH 414A Digital Ceramics
The production of ceramic building materials spans from individually constructed and handcrafted to industrial and mass produced. Some of the earliest examples of permanent structures include clay-based building components. At the turn of the century, the Hydraulic Press Brick Company in St. Louis was the most innovative brick company in world, producing 100 million bricks per year by 1900. The abundance of clay and the affordability of bricks contributed to the longevity of building stock, where even modest homes had ornamental bricks, corbeling, recesses, and extensions. Historically, fired clay building components were valued for their strength, modularity, fire resistance, raw material availability, and aesthetics. Ceramic building units are pervasive in their use in the built environment, but they have been underappreciated in contemporary architecture practice. Digital Ceramics examines new possibilities for masonry and ceramics in architecture through computational design and digital fabrication. Algorithmic design techniques, digital fabrication, and ceramic research will be merged for the design and production of nonstandard ceramic components in aggregated assemblies. Readings, tutorials, and guest lectures throughout the course will focus on innovations in digital technology, digital fabrication, advanced geometry, and material practices. Student work will include the creation of 3D-printed and/or CNC-produced molds and slip-cast ceramic components. Additional course work will include drying and firing clay components, staining and glazing techniques, and clay body research. Students will also be introduced to ceramic 3D printing during the course. Digital Ceramics confronts the seemingly disparate modes of physical making and digital form-giving with the introduction of a new material system that expands the aesthetic and performative potential of aggregated enclosure assemblies. In recent digital discourse, we have seen the ability for endless variation and customization through the use of parametric design software. This course intends to underscore a thoughtful consideration of the relationship between technology and adaptability. Through material behavior and calibrated irregularities, we have the capacity to make each component unique. Experience with digital modeling (Rhino) and digital fabrication is strongly encouraged. Credit 3 units.

A46 ARCH 418A Design Culture
This course will provide an overview of historical and contemporary design issues, including (but not limited to) graphic design, communication design, industrial design, furniture design, film, and animation. Lectures, films, and readings will deepen students' knowledge of how different design practices complement and enrich architecture and broaden their understanding of how history, philosophy, and technology have shaped different design movements. Credit 1.5 units.

A46 ARCH 419 Architectural Design III (MArch 3)
The third of a three-semester sequence of design studios. Continues examination of issues raised in ARCH 317 and ARCH 318. Credit 6 units.

A46 ARCH 421U Urbanism: Chicago
This design research seminar focuses on the urban infrastructure and associated buildings of central Chicago, in and around the areas near the Loop. The Chicago metropolitan area is the third largest in the United States, and from 1870 until the 1950s, Chicago was America's "second city," surpassed in size only by New York City. It remains the densest and most "urban" of the cities of the Midwest, with many examples of complex interconnections between rail lines, highways, and various kinds of pedestrian-oriented urban environments. This seminar combines historical and field research on some of the many architectural urban design interventions in Chicago. Students choose among several topic areas to produce detailed drawings and digital models of specific urban interventions. There will likely be a publication of the work. Topic areas for digital documentation include the pedestrian relationships between transit lines and various buildings and urban complexes, including the large Millennium Park interventions by SOM and others over the Illinois Central railway lines adjacent to Lake Michigan, and Wacker Drive, a 1920s underground limited access highway along the Chicago River, and other projects. Fulfills History/Theory and Urban Issues elective requirement. Credit 3 units.

A46 ARCH 421V Unbuilt Sert
This design research seminar will focus on the digital simulation of the unbuilt architectural design projects of Josep Lluís Sert (1901-83). This spring we will document and analyze Sert's drawings for St. Botolph's Chapel (1963) designed for the Boston Government Center complex with the goal of virtually "building" it. Sert practiced in Barcelona in the 1930s during the era of the Spanish Republic and later in the U.S. as both architect and planner. He was the President of CIAM (International Congresses of Modern Architecture) from 1947-56, and Dean of the Harvard Graduate School of Design from 1955-69 where he developed urban design as a discipline and academic program. The chapel was an effort to combine elements of Catalan modern architecture with his concept of a modern "New Monumentality" suitable to the postwar world. The seminar will also visit several of Sert's major built projects in the Boston area, and will include presentations by Dean Emeritus Edward Baum, who was job captain on the St. Botolph's chapel project with the Sert, Jackson firm. Students will work in teams to produce detailed digital models of the project to simulate the "built" chapel inside and out. Publication of the work is anticipated.
A46 ARCH 421W Designing the Modern City
This course, which is based on the textbook Designing the Modern City: Urbanism Since 1850, is a lecture course that examines designers' efforts to shape modern cities. Topics covered include the technical and social changes in mid-19th century industrial cities, notably London, Paris, and Barcelona, as well as varied efforts to shape urban extensions and central new interventions elsewhere. These include reform housing efforts for the working class in 19th-century London and New York, Städtebau (city building) in German-speaking environments, the Garden City Movement, the American City Beautiful movement, "town planning" in Britain, and "urbanisme" in France (the source of the contemporary term "urbanism"). Less well-known topics that will also be addressed are urban modernization in East Asia before 1940 and suburban planning in the United States, including Frank Lloyd Wright's Broadacre City. The book also addresses social change and modern urbanism in Europe in the 1920s, including the emergence of CIAM (International Congresses for Modern Architecture), which met from 1928 to 1956; the political, technological and urban transformations of World War II; the expansion of racially segregated decentralization in the United States; and some European and Latin American postwar urbanism. It also addresses urbanistic aspects of postwar architectural culture, including critiques of modernist planning by Jane Jacobs and others and more recent responses to the ongoing challenges posed by efforts to create organized self-build settlements and to make more ecologically sustainable cities.
Credit 3 units. Arch: GARW, RW

A46 ARCH 421X Modern St. Louis, 1940 to 1974: Art, Architecture and Social Change
This seminar addresses the research question, "How did modern art and architecture become such a major aspect of St. Louis's cultural life in the middle decades of the 20th century?" Offered in preparation for a fall 2022 exhibition on this topic at the Kemper Museum, the seminar will research this question, both by presenting notable works of modern architecture that were built here and by examining art collecting and philanthropy here during this time period, where new and more socially inclusive values then associated with modern art had a significant impact on changing both the political and artistic culture of this large metro region. Architectural works to be researched include the works of Harris Armstrong; Cloethiel Woodard Smith (a Washington University architecture alumna); Samuel Marx; Frederick Durrell, Eric Mendelsohn; Eero Saarinen; Dan Kiley; Joseph Murphy and Eugene Mackey, Jr; George Hellmuth, Minoru Yamasaki and Gyo Obata; and Charles E. Fleming. Prerequisites: Architectural History I & II or equivalent.
Credit 3 units. Arch: GARW, RW

A46 ARCH 421Z The Chicago Skyscraper
This seminar will consider a set of projects by Burnham and Root, Holabird and Roche, Wm. Le Baron Jenney, Louis Sullivan, and others. A central example will be the Monadnock Building, with its two sections by Burnham and Root (1891) and Holabird and Roche (1893). As one of the main lines of inquiry, we will define the skyscraper type, evaluate examples through comparative study, and unfold "intersectional" aspects of the buildings with respect to race, gender, and labor. Special attention will be paid to symbolism and the relationship between structure, tectonics, and ornament programs. Circumstances permitting, the seminar will apply photogrammetric techniques to the documentation and study of architectural details, entailing a field trip. Space will be reserved for undergraduate students. Prerequisite: Architectural History I or II.
Credit 3 units. Arch: GARW, RW

A46 ARCH 422H Urban Topographies
This digital seminar introduces students to the basics of geospatial modeling at both regional and local scales, with an emphasis on the creative application of GIS data toward design thinking, site analysis, and speculative urban design. The course explores the potential for GIS data as more than just for inventory and mapping, but also as an invaluable creative design tool. A series of digital workshops will touch on a range of cross-platform workflows, from digital cartography to parametric modeling to 3D animation. Tying this together will be a speculative urban landscape project that the students will model and visualize utilizing the software introduced. This year's iteration will lean more toward an experimental and explorative use of GIS for design, art and visualization. This course is intended to give students the flexibility to approach the syllabus as an independent study or as a supplement to their studio work. Software that will be covered includes ArcGIS, Autodesk Infraworks, 3DSMax and Grasshopper.
Credit 3 units. Arch: ECOL

A46 ARCH 422J Confronting Urbanization: The Interactive Tissue of Urban Life
This course invites architecture and urban design students to explore the urban condition through the lenses of its interactive tissue -- a tissue that includes smartphones, the World Wide Web, credit cards, highway systems, airports, sidewalks, and indoor plumbing. Within this frame of reference, students are encouraged to investigate, unearth, and document with surgical precision the emergent interrelationships between actors, the agency through which actors engage with the interactive tissue, and the ways in which these actors and relationships shape and influence one another. With the understanding that ideas are generated through speculation, projection, and experimentation, we will use the third dimension as a point of departure toward the fourth dimension of time, and we will aspire to the fifth dimension of lived experience. It is most welcomed that students bring their curiosity to the course, that they are interested in being investigative, and that they are open to various mediums ranging from reading theories of urbanization, drawing, and experimenting with physical/interactive objects to using projection as a tool to document their research in both analog and digital formats. The final product of this course will be a presentation during which students will present their research through multiple media outlets, which may include drawings, installation work, or moving images.
Same as A49 MUD 422J
Credit 3 units. Arch: GAMUD, GAUI, UI Art: CPSC

A46 ARCH 423 History of Landscape Architecture
This course reviews the history of gardening in the Western tradition from the Renaissance to the present and in the Chinese and Japanese traditions. Park-making, neighborhood design, and the rise of landscape architecture as a profession receive attention, including several classes held at notable St. Louis examples. Course requirements include readings, a design or research project, and a final exam. Fulfills History/Theory elective.
Credit 3 units.
A46 ARCH 423D Videography for Designers
This seminar course examines the practice of capturing, producing and analyzing moving images as a method of inquiry for design. We focus on the analytical and communicative qualities of time-based media (recorded sequences, video, slide shows, animation, simulation, remote sensing, etc.) as a human-landscape intermediary that has the ability to alter understanding and evaluation of the environment. We explore techniques from a range of disciplines — art, design, sociology, anthropology, etc. The course meets weekly for brief lectures/presentations to direct our inquiries, discussion of foundational readings and ideas, media workshops, screenings, local field trips, and/or student presentations of work. Throughout the semester, students generate brief, exploratory work that focuses on methods and techniques, and a larger, final project that engages the themes of the course. Open to all graduate and upper-level undergraduate students, a goal of the course is to blur boundaries between art and design, and to capitalize on their various approaches. No experience with video, animation, or other software is required — only the desire to explore and incorporate time-based methods into individual processes. Same as A48 LAND 423D
Credit 3 units.

A46 ARCH 423E Cinematic Landscapes: The Making Of
Watch movies. Talk about movies. Analyze the making of movies. Make a movie. Climate-themed movies. Post-apocalyptic movies. Meet in technology. Learn to scientifically use drones. Learn to scientifically use LiDAR. Use these tools in your climate-themed movie. Sculpt stories in time, supported by sound. This course will focus on the analysis of landscapes and cities as portrayed by popular cinema. How didactic portrayals of nature and cities are circulated by popular cinema. Stories through which the values, common referents, public concepts, and memes of a culture materialize through the construction of movies. Interior to the semester there is an interdisciplinary workshop. Four-day fieldwork with Geology Assistant Professor Alex Bradley. Map and produce digital representations at 2-cm resolution of a mountainside scour by a burst reservoir. This class is divided into three parts: watch, learn, and make. Watch: Each week, students will be asked to watch one movie and one director's commentary, often referred to in the "bonus features" as "the making of." Learn: Students will study the methods and techniques used to create settings, props, and storyboards in the service of a sound vision. Make: Students will synthesize digital and analogue time-based media tools (sound and video) to make a movie thematically based on climate change.

Same as A48 LAND 423E
Credit 3 units.

A46 ARCH 424L The Chinese City in Historical Perspective
This seminar examines the development of urban centers in China through history. The city is approached from formal, territorial, political, and socio-economic perspectives, situated in the broader landscape of cultural and environmental changes. Key themes are continuity and change, citizenship and public life, urban form and structural transformations, and infrastructure and the hinterland. The course begins with archaeological and textual origins of the earliest cities and ends with the staggering growth and globalization of Chinese cities today. Credit 3 units.

A46 ARCH 427H The Crystal Palace
The seminar will seek a thorough acquaintance with the Crystal Palace, the structure that housed the Great Exhibition of 1851 in London. We will follow a timeline from the building's origins in theories of art and society to its design and construction at Hyde Park, its opening, its exhibits, its wide publication in the media, its catastrophic fire, its reconstruction on a new site, and its final demise in 1936. We will examine the building's structure and details and the extent to which project and building served to plan parts of the city and inaugurated a new type of space for the public display of objects. Looking at authors of this project, including Joseph Paxton and Owen Jones, we will explore the implied relationships between architecture and landscape and between architecture and the decorative arts, including the unsteady beginnings of design for mass production. We will revisit debates this building provoked concerning the nature of ornament and the very definition of architecture. In reviewing the building and its contents, we will ask questions about antiquarianism and the return of the temple as a symbol; about natural histories, techniques of inventory, and the context of the British Empire; and about the role the Crystal Palace has played in narratives of the history of modern architecture. Readings will include selections from Paxton, Jones, Ruskin, Semper, Pevsner, Hegel, Benjamin, Tafuri, Said, Ranciere, and others.

Credit 3 units. Arch: GARW, RW

A46 ARCH 4280 Architectural History I: Antiquity to Baroque
This lecture course will introduce major historical narratives, themes, sites, and architects from ancient Greece to the end of the Baroque period. We will take an extended look at the dawn of the modern period during the 15th and 16th centuries through a global perspective, turning eastward from Renaissance Europe to the Ottoman, Mughal, Chinese, and Japanese empires. The great chronological and geographic span of this course will be pulled together around the themes of classicism and its subsequent reinterpretations as well as the pursuit of the tectonic ideal. Our aim is to recognize how these ideological pursuits of modern architecture evolved out of longer historical processes. We will also pay close attention to major sites of landscape and urban-scale work. Requirements will include a mid-term exam, a final exam, and a series of short papers.

Same as A46 ARCH 3280
Credit 3 units.

A46 ARCH 4284 Architectural History II: Architecture Since 1880
An introductory survey of the history and theory of architecture and urbanism in the context of the rapidly changing technological and social circumstances of the last one hundred and twenty years. In addition to tracing the usual history of modern architecture, this course also emphasizes understanding of the formal, philosophical, social, technical, and economic background of other important architectural directions in a global context. Topics range from architects' responses to new conditions in the rapidly developing cities of the later nineteenth century, through early twentieth-century theories of perception and social engagement, to recent efforts to find new bases for architectural interventions in the contemporary metropolis.

Same as A46 ARCH 3284
Credit 3 units. Arch: HT: EN: H
A46 ARCH 4288 Architectural History III: Advanced Theory
The third survey class focuses on architectural history and theory after modernism. It examines the rise of architectural theory as a field of inquiry and its links to both critical social theory — including the Frankfurt School — and to contemporary traits of philosophical postmodernity. From the contextual questions of meaning and memory to the examination of post-structuralism, cultural theory and identity politics — including race, gender and ethnicity — the course uses primary textual sources to illuminate drawings, buildings and ideas that defined this seminal moment in architectural history. While the course closely examines this time period of intense search for a new visual language, it also probes contemporary complexities of architecture's continued search for visual and social purpose in an increasingly interconnected world.
Credit 3 units. Arch: GARW, RW

A46 ARCH 428U American Architecture and Urbanism
This seminar will focus on new ways of thinking about American architecture and urbanism in the twentieth century. It is part of an effort to offer new conceptual frameworks to understand American architecture within its larger context of social, political, and urbanistic change. Unlike an architectural history survey course, it will not only focus on the canonical works of well-known designers such as Ludwig Mies van der Rohe or Louis Kahn, but will also situate architecture within the various new social, spatial, technological, and legislative directions that have shaped American metropolitan areas since then. Students will present selected readings and pursue individual research projects for this course.
Credit 3 units. Arch: GARW, RW

A46 ARCH 430A Special Topics: Solar Decathlon Design Challenge for a Zero-Energy Elementary School (ZEES)
The U.S. DOE Solar Decathlon is a powerful education tool not only for the decathletes who participate directly but also for homeowners, property developer, and professionals. Team WashU successfully participated in Solar Decathlon in 2017 and 2018, the Crete House and the Lotus House. Together with KRJ Planning and Research, an architectural firm with a specialty in K-12 educational building design, planning, and research, this course will participate in the Design Challenge for an Elementary School located in St. Louis. Mr. David Kromm is the President of KRJ Planning and Research. He is a distinguished alumnus with 35 years' experience in architectural design and building science. He will be one of the instructors for this course with Professor Hongxi Yin, the leading faculty of two solar decathlon houses. The course will explore the best practice of the K-12 elementary school, passive design strategies, and cutting-edge building technology. The student will have the opportunity to collaborate with a local K-12 school administration agency. The students will develop a set of the schematic design document and technical report covering all aspects of building technology. This course may lead to the Build Challenge, a full-size demonstration in St. Louis and Washington DC.
Credit 3 units. Art: CPSC

A46 ARCH 430B Special Topics: Smart Residential Retrofit
In this seminar, students will explore means to retrofit an existing local residential building through the lens of: maximizing quality of life, allowing flexibility due to changes in owners' needs over time, and energy optimization. Employing Building Information Modelling (BIM) we will learn to think as designers, engineers, developers, and home owners simultaneously. Going on-site to use standard measuring methods as well as high tech scanners, we will document and draw the existing conditions in detail. Students will translate the existing conditions using simple surgical alterations to activate both site and building. Finally, using a variety of rudimentary and advanced techniques, participants will investigate and present how these changes might play out over time. The intent of this class is, to explore pragmatic architectural tools and techniques in the context of transforming existing housing stock into environmentally sustainable, socially responsible, and financially viable innovative homes. No prior BIM experience required.
Credit 3 units.

A46 ARCH 430C Special Topics: Pyrocene
In the last five years, catastrophic wildfires have raged globally, burning hotter, faster, larger, and longer in California, Australia, the Amazon, and beyond. A firestorm of images -- frantic smartphone footage, smoldering drone shots, panoramas of orange haze -- has ushered a vision of an apocalyptic "new normal" into public consciousness. In 2015, the scholar Steven Pyne coined the term "Pyroocene" to describe our current "age of fire," defined not only by the accelerated burning of living landscapes but also "lithic" ones, in which the spectacle of the fire crisis can only be understood in relation to deeper climatic and cultural transformations produced by fossil fuel combustion. This interdisciplinary seminar will explore avenues for architectural and cultural practice in the Pyroocene, which some scholars have called the "arts of living on a damaged planet." Approaching wildfire as a phenomenon at the intersection of landscape and urbanization, the course will center design disciplines but also develop robust connections to political ecology, eco-aesthetic art, decolonial anthropology, eco-poetic literature, and ecologically oriented philosophy. Drawing from readings and case studies in various fields, students will experimentally develop projects that traverse diverse critical frameworks for understanding, shaping, inhabiting, and tending contemporary fire landscapes.
Same as A48 LAND 430C
Credit 3 units.

A46 ARCH 430D Special Topics: The Thin Side of Concrete
Building enclosures constitute the physical barrier between interior and exterior environments. They protect interior spaces against water, wind, sunlight, temperature, sound, and other forces of nature. Today, building enclosures are sophisticated assemblies conceived through complex processes that merge design, science, and craft. The outermost layer of the exterior wall is the most exposed to natural forces, so it needs careful attention; its performative aspects must work effectively over the lifetime of the building. The design of building enclosures must be evaluated in terms of function, aesthetics, feasibility, durability, maintenance, and cost. Concrete has a long history as a building material. Although Roman use of the material is widely known, concrete gave modern architecture a versatile material to explore new kinds of structures and assemblies. During the last few decades, precast concrete has grown within the building industry as a viable alternative due to its strength, durability, resiliency, and cost. As newer technologies have emerged, concrete has experienced several improvements, among which the reduction of its thickness is maybe the most remarkable. This seminar focuses on the use of thin concrete assemblies as a performative part of building envelopes. Students will start by conducting research and analyzing the historic and contemporary use of concrete in building precedents. They will...
then proceed to identify a specific environmental condition that their enclosure study will respond to and advance the design through detail drawings and study models, culminating in a full-scale mockup assembly. Credit 3 units. Arch: NSM EN: H

A46 ARCH 430F Special Topic: Laboratory for Suburbia
During the past five years, America's suburbanized landscape has emerged as a site of urgent electoral, cultural, and spatial contestation; it is arguably the defining geography of the national political moment. The fields of design and art, however, have largely failed to engage this critical space, remaining focused instead on prestigious cosmopolitan destinations and distressed inner-city communities. This interdisciplinary course will ask students to step into this gap, exploring and proposing new forms of critical suburban practice. This course is interdisciplinary, and students with interests in visual art, architecture, urban design, art history, public art, planning, performance, urban history, American Studies, and anthropology are especially encouraged to enroll. For the course's final project, students will draw from research and fieldwork to produce propositions for interventionist art or design projects in St. Louis. Final projects can include "paper architecture" renderings, sculptural maquettes, video works, performances, curatorial projects, or scholarly papers that point toward new models for critical and visionary suburban practice. Credit 3 units.

A46 ARCH 430G Special Topics: What Does the Museum Look Like?
The museum as an architectural typology and emblematic cultural device is currently undergoing an intense transformation. This seminar aims to shed light onto this typology and the role that museum architecture has as a mechanism to activate present-day communities. A research will be conducted through this type of contemporary culture condenser, having in mind digitalization and globalization. It will also take into account the idea that a museum is not only a display or receptacle dedicated to established areas or disciplines such as the arts, science, sports and industry, among others. The research methodology will consist in the analysis and deployment of seminal and particular study cases to then revise and propose alternatives for the evolution of the museum as an architectural device for contemporary culture. The course will address and discuss different topics such as the idea of destabilizing the museum as an institution, dealing with conflict as a positive, alternative way to generate content, and thinking about this typology as a place dedicated mostly to positive interaction, discussion, service and exchange within the community. In order to compare and get a global perception of this particular museum constellation, specific graphic standards will be used to represent the analysis and deployment of the study cases. Such analyses, as well as the results of the discussions and pieces of work produced during the seminar, will be compiled into a small publication. Credit 3 units.

A46 ARCH 430J Special Topics in History & Theory: Documenting Le Corbusier
This design research seminar will focus on the digital and physical modeling of some of the architectural design projects of the French-Swiss architect Le Corbusier (1887-1965). Students will work in teams to produce drawings and physical models of built projects such as the monastery of La Tourette (1953), and unbuilt designs such as the League of Nations headquarters (1926). Students will work individually and in teams. Exhibition and partial publication of the work is anticipated. Credit 3 units. Arch: CAST, GACS

A46 ARCH 430K Special Topics in History & Theory: Reflexivity and Triangulation in Architectural Research
This course will introduce students to architectural research methods where triangulation and reflectivity will be applied to a specific neighborhood in St. Louis to respond to architecture racism and urban inequalities. The primary purpose of the course is for the students to examine migration strategies through enhanced analytical techniques. Using the neighborhood plan produced in the Segregation by Design seminar, students are asked to generate a more robust analysis of the findings by employing different triangulating types to increase confidence in the research data, reveal unique findings that might be not present if only one method was previously used, challenge or integrate theories, and clarify the understanding of the problem by offering other perspectives. The information will be compiled into the book Segregation by Design as part of the conclusion and will be presented to neighborhood stakeholders. Credit 3 units. Arch: CAST, GACS

A46 ARCH 430M Special Topics in History & Theory: Hidden in Plain Sight: How to Read a Building
This seminar is an exploration of the importance of autonomy, formal analysis, and the rigorous use of architecture's unique language in the service of an idea, all unrelated to "style." The aim here is to demonstrate that, in the best of architecture — particularly in the Great (Canonical) Works — there is an "intention" that can be "read" in the buildings. These readings demonstrate a recurring methodology that can represent a rigorous, timeless, and comprehensive approach to understanding meaning in architecture from antiquity to the present. These intentions, which can be expressed as diagrams, are hidden in plain sight. They are not, in this context, diagrams of information that simply depict program, geometry, structure, circulation, and so on. The course will be comprised of lectures, reading assignments, in-class discussions, and drawing exercises. The lectures will introduce specific examples of the language of architecture. Using this language, students will analyze individual structures and compare buildings side by side. These comparisons will include buildings that come from different historical periods and that look nothing alike but that will be found to share the same basic diagram, as well as buildings that appear to resemble each other but that are fundamentally different. The goal is to learn to read buildings, to see in a deeper way, and to use that skill to analyze, refine, and correct one's own work. Credit 3 units. Arch: GARW, RW

A46 ARCH 430N Special Topics in History & Theory: Learning From Pruitt-Igoe
This seminar examines the design and adaptation of ordinary inhabitation, taking as its starting point the Pruitt-Igoe housing project in St. Louis. Did this housing project succeed or fail as architecture? This question may have been asked for the wrong reasons. We will examine whether Pruitt-Igoe fulfilled the United States government's goal of creating modern, effective mass housing for working-class Americans. The path to an answer will examine the tangle of architectural modernism (and its critics), vernacular architecture, U.S. housing policies, and ideological
A46 ARCH 4300 Special Topics in History & Theory: The Crystal Palace
The seminar will seek a thorough acquaintance with the Crystal Palace, the structure that housed the Great Exhibition of 1851 in London. We will follow a timeline from the building's origins in theories of art and society to its design and construction at Hyde Park, its opening, its exhibits, its wide publication in the media, and its catastrophic fire, reconstruction on a new site, and final demise in 1936. We will examine the building's structure and details and the design and construction of which project and architecture served to plan parts of the city and inaugurated a new type of space for the public display of objects. Looking at authors of this project, including Joseph Paxton and Owen Jones, we will explore the implied relationships between architecture and landscape and between architecture and the decorative arts, including the unsteady beginnings of design for mass production. We will revisit debates this building provoked concerning the nature of ornament and the very definition of architecture. In reviewing the building and its contents, we will ask questions about antiquarianism and the return of the temple as a symbol; about natural histories, techniques of inventory, and the context of the British Empire; and about the role the Crystal Palace has played in narratives of the history of modern architecture. Readings will include selections from Paxton, Jones, Ruskin, Semper, Pevsner, Hegel, Benjamin, Tatufi, Said, Rancière, and others.
Credit 3 units. Arch: GAHT, RW

A46 ARCH 431A Architecture in the Age of Identity: Race, Gender, Ethnicity and Their Discontents
Identity is both an individual and social category. It is deeply personal, woven with memories, feelings and emotions, but also collective, informed by history, society and culture. Consequently, this gap between individual self-expression and societal conformity remains one of the fundamental tensions of human existence, but also a source of inspiration and imagination in our rapidly changing world. Categories such as race, gender, class and ethnicity-as well as their intersections and overlaps-remain dynamic. They constantly evolve, responding to the changing socio-economic context and engaging an ever-expanding array of cultural production-from literature and film to philosophy and sociology. This course expands the conversation even further, examining the relationship between design and identity in architecture, with a particular emphasis on architectural education. Covering a range of case studies and the exigency at the end of World War I, the course moves freely across various divides-between North-South and East-West, between socialism and capitalism-examining the representation of identity through a variety of architectural media, including drawings, texts and buildings. The course probes architecture schools and practices as both disciplinary enterprises and as hubs of identity formation, suggesting the capacity of equity and representation to serve as agents of both political and architectural emancipation. The course content includes lectures, discussions and presentations, as well as reading and research. The course is open to both undergraduate and graduate students and it has no pre-requisites.
Credit 1.5 units. Art: CPSC

A46 ARCH 431B Modern Architecture, Race, and Ethnicity
This course will review the issues mentioned in the title as represented in recent literature and historical examples, focusing mainly on the urban context but more on architecture than urbanism. Themes will include the history and theory of architecture; architecture as art and as service; architecture and social class; and technology and intersectionality. An emphasis will be placed on information literacy, including the use and management of primary and secondary sources, accessed digitally. Assignments will include a series of short papers and a final paper. Space will be reserved for undergraduates.
Prerequisite: Architectural History II or equivalent.
Credit 3 units. Arch: GARW, RW Art: CPSC

A46 ARCH 435E Furnish It, With Pieces
Public space is a key constituent that determines the character of a neighborhood and a city. It is embedded in the urban fabric and it can mediate the relationship between people and their particular surrounding landscape. Urban furniture and hardscape can play an important role in offering a wide range of uses for public spaces. The design of such pieces affects the way people live and experience a particular environment. The ultimate goal of this course is to design, fabricate and install a set of repeatable units to equip a vacant urban lot in order to offer opportunities for social interaction. The seminar focuses on the in-depth understanding and development of ideas based on the technical, experiential and aesthetic exploration of one material: concrete, into one specific application: urban furniture. This seminar builds up on the scope of the Creative Activity Research Grant awarded by the Sam Fox School of Design & Visual Arts where five porous concrete pavers were designed for a vacant plot in North St. Louis. The challenges are to adapt the given pavers to a new site condition and to propose new urban furniture made out of concrete. It involves the construction of pieces able to equip a gathering space as well as sidewalks that can offer local residents the opportunity to interact with others. This provides not only aesthetic appeal to the residents and visitors, but also allows the possibility of implementing an actual project in an abandon plot in Old North. We will enrich the community with a wide range of training opportunities as each step in the process of making the plaza is used for teaching purposes, from making pavers and other pieces, to salvaging, reusing or repurposing recycled material. Students are asked to design and build concrete urban furniture necessary for the gathering area. The pieces can encompass a wide range of uses: chairs and benches, tables, raised beds, planters, litter bins, modular fencing and mobility-related pieces such as bike racks, bollards and car stoppers. This is an opportunity for hands-on experience. These pieces have to consider the limitations of the material in terms of strength, weight, size, etc.; learning about the material itself as well as the act of construction, assemblage and mass production, which includes methods and technology, ranging from tools to molds. The formwork for the concrete pieces will be built through a process of CNC milling and rubber molds or vacuum formed plastic. The challenges are to define environmentally sensitive strategies for problem solving, conceptual development and poetic expression at both levels of the design process, conceptual and real. Sustainable principles such as the use of recycled...
materials as an aggregate in the concrete mix are an important consideration. Construction is the ultimate goal of this class. We work in collaboration with Anova, a local manufacturing company dedicated to the design and production of site furnishings. Anova provides some materials and brings their expertise to the project. Credit 3 units.

A46 ARCH 435F Precast Concrete Enclosures
In contemporary construction practice, building enclosures are sophisticated assemblies conceived through complex processes that merge design, science, technology and craft. The outermost layer of the external wall is the most exposed to natural forces and therefore it needs careful attention as it must work effectively over the lifetime of the building. The primary goal of this fabrication seminar is the construction of full-scale mockup pieces that function as part of real building envelopes; this is an opportunity for hands-on experience. Students will design, develop and build enclosures and view the output of this class will be detailed, annotated drawings of each different types of precast high-performance concrete assemblies as critical components of building envelopes. The course will be developed in partnership with Gate Precast, a leader company in the precast concrete industry. Supported by a grant from the PCI Foundation, students will have a budget of $12,500 to design and prototype precast mockups of building envelopes. Students will start by conducting research and analyzing historic and contemporary buildings, focusing on their skin properties and configurations. Then, they will proceed to identify specific environmental condition(s) and develop an enclosure as a response to such condition(s), advancing the design through detail drawings and study models, culminating in a full-scale mockup mold. Construction of the molds will be done at Washington University's facilities combining digital and analog methods of fabrication, including CNC milling, laser cutters, 3D printers, and vacuum-formed plastic, among other methods; a fully equipped wood shop is also available. Once the molds are finalized, they will be transported to Gate's architectural plant in Ashland City, TN, for reinforcing and concrete casting; this project will culminate in the demolding of full-scale precast mockup pieces. Students will tour the facility and participate in the entire fabrication process, including mold preparation, reinforcing, casting, demolding, handling and finishing of the final panels. Credit 3 units.

A46 ARCH 4362 Advanced Grasshopper
With a base knowledge of the Rhino+Grasshopper interface, this class will focus on developing an entirely scripted building system. Each student will be given a set of initial parameters (building volume, square footage, percent of transparent/opaque facade, required programmatic elements/size, etc.). They will begin by selecting a formal precedent that will help them determine a structural system. Within this framework, students will develop an algorithmic logic to organize program and then articulate a responsive skin. The goal of this exercise will be to develop understanding of the potential use of scripting in design. Scripting allows the designer to transform their design dynamically as the parameters change or update. The final output of this class will be detailed, annotated drawings of each student’s structural system as well as a 1/4” scale model of a small portion of their design utilizing available tools in the FabLab such as 3D printing and CNC routing. Students taking this course must have working knowledge of Grasshopper. This class is an advanced class exploring design through generative modeling. Credit 3 units.

A46 ARCH 436A Information Modeling and Technology
This foundation-level course will introduce students to the digital tools of Geographic Information System (GIS), Building Information Modeling (BIM), and Building Performance Analysis (BPA). Its goal is to equip the student with the ability to gather information, analyze it, and make decisions within the information-rich environment of architectural design and construction. Students will develop an understanding of these three seemingly distinct approaches and their role in preserving the quality and quantity of accumulated information for “upstream” use. The topics addressed in the course will be further developed in more advanced courses during subsequent semesters. The introduction of information-gathering principles within GIS will expose students to the wealth of information, such as maps and census data, that is already available, as well as methods of turning raw data into analytical material for use in their design work. This segment of the course not only provides a foundation to ArcGIS, but also leads toward use of this information within applications like Revit Architecture. Creating and managing an information pool of digital GIS and design and construction data and making it available throughout the lifecycle of a project is commonly referred to as BIM. In the second part of this course, we will explore how BIM is being utilized today and learn the basics of one of the leading BIM-compliant applications, Autodesk Revit Architecture 2010. During the third part of this course, students will be introduced to BPA, a process that embodies a holistic approach toward the integration of sustainability and design. By understanding when and how to apply sets of analytical exercises via applications like Ecotect Analysis within the context of Information Modeling, students will develop an understanding of how design decisions have a profound and lasting impact on the overall building sustainability and performance. Credit 3 units.

A46 ARCH 436B BIM in Practice
Building Information Modeling (BIM) is a developing method of creating, sharing and managing project data through a visualized 3D or 4D model. While it continues to deliver on an initial promise to increase design consistency and efficiency while minimizing errors, the focus of attention is shifting to the use of BIM to facilitate integrated methods of project delivery. The course explores the use of the BIM platform and the development of data exchange methods in architectural design through a case study and subsequent design project. Students are provided instruction in Revit covering the creation, management and extraction of data from a model, but also look at the technology more broadly, discussing the changes advanced by the deployment of BIM processes in practice. Credit 3 units.

A46 ARCH 436D Advanced BIM in Practice
While the adoption of BIM continues to grow across the industry, criticism of its effectiveness as a design tool remains. The foundation of BIM, the creation and management of geometric objects with associated non-geometric data, is often at odds with established methodologies of design. Current practice typically manages this schism by separating design from the use of BIM for documentation and construction. The class will seek to develop methods of design within a BIM environment, not through the translation or reshaping of traditional techniques, but through the design of a methodology that seeks to capitalize on what BIM enables: direct, digital collaboration and the facile management of large data sets. This is not an introductory class.
The class places an emphasis on each student developing their context, including environmental, material and spatial realms. Environmental Systems I, site planning module, addresses design practice, and to equip them with the basic knowledge of working with issues of sustainability, which can inform their direct these flows at macro and micro levels. Two goals for the class are, first, to provide students with ways of thinking about and of working with issues of sustainability, which can inform their design practice, and second to equip students with the basic knowledge needed to continue within the technology sequence. Students enrolling in the course should have completed at least one digital seminar as a prerequisite. Credit 3 units.

A46 ARCH 436E Technology + Tectonic
Beginning with a rigorous study of three-dimensional grid systems, students will work in pairs to develop conceptual proposals for site-specific hanging installation. Students will examine materiality, grid distortions, and spatial qualities, as well as interactions with natural light and human input. The ideas generated in this course have the potential to directly affect an architectural installation the following semester. Students enrolling in the course should have completed at least one digital seminar as a prerequisite. Credit 3 units.

A46 ARCH 436F Designing with Grasshopper
The best way to learn how to design with Grasshopper is to use it. Each student will be guided through five different projects incorporating computational design logic throughout. The outputs of this course will be published on Instagram (@wustlhopper) and/or reddit (r/generative). The course will build in complexity as it progresses through Grasshopper methods and plugins. At the end of the course, each student will have completed a 2D patterning project going from Rhinoceros to Illustrator/Photoshop, another 2D patterning project animated in Grasshopper through Photoshop, a 3D patterning project animated in Grasshopper through Photoshop, a simulated interaction using kangaroo and animated, and a fully rendered looping model incorporating all of the lessons from throughout the course. Credit 3 units.

A46 ARCH 438 Environmental Systems I
Environmental Systems I is the foundation course in the architectural technology sequence. This course addresses the relationship between buildings and an expanded idea of context, including ideas of environment, landform, energy, material and space. The class places an emphasis on each student developing their own attitude toward architectural sustainability, its role within the design process, and its relationship to architectural form. The theme of site expands the idea of the architectural project to examine landform, position, foundation, access and region. Two goals for the class are, first, to provide students with ways of thinking about and of working with issues of sustainability, which can inform their design practice, and second to equip students with the basic knowledge needed to continue within the technology sequence. Students enrolling in the course should have completed at least one digital seminar as a prerequisite. Credit 3 units.

A46 ARCH 438C Expanding Skin
In the 1957 text “The Pliable Plane: Textiles in Architecture,” Anni Albers wrote, “if we think of clothing as a secondary skin we might enlarge on this thought and realize that the enclosure of walls in a window is a third covering, that our habitation is another ‘habit.’” In this text, Albers proposed the concept of skin as an inhabitable layer, first as a covering for the body and then as an expanded layer of enclosure. This course will explore Albers’ concept of a second skin by developing new strategies for constructing complex surfaces at the scale of the human body, particularly in the context of digital fabrication and computational design. Emphasis will be placed on assemblies that yield innovative visual or tactile effects while also engaging specific material performance. How can we design with a focus on performative pattern that can enclose the body and its structural and geometric complexities? How can we conceive of patterns that are not disrupted by these complexities but rather enhanced by them? The course will consist of lectures, readings and seminar discussions, tutorials, iterative material investigations, 3D digital modeling, and digital fabrication. Student projects will focus on the design of inhabitable, layered constructions while engaging constructive techniques from both the fashion and architectural disciplines. Rhino (with Grasshopper), Maya or Z Brush will be utilized for the initial digital investigations. Students will experiment with materials and develop innovative construction methods that engage digital fabrication tools such as the 3D printer, laser cutter, and CNC mill for the production of a second skin in the form of a garment for the human body. Credit 3 units.

A46 ARCH 439 Environmental Systems II
We as architects have to analyze and address complex issues and relationships, synthesize them, and then make them manifest through clear design strategies. Building systems must reconcile solar heat gain, glare control, daylight levels, thermal insulation, ventilation, acoustics, air quality, structure and fabrication — all in relation to the scale and comfort of the human body. The development of environmental systems into a clear, comprehensive, and elegant design solution cannot be an afterthought; it must be a synthesized and integral part of the design process, with a clear strategy that operates at multiple scales. Building upon the passive strategies explored in Environmental Systems I, this course will lay the foundation for the integration of active environmental systems with enclosure, space, and the requirements for human occupation. This will be done through the study of climate, air, temperature, water, light, sound and energy. Each topic will be assessed against principles, possibilities and potential. This course focuses on how important it is to consider active systems as part of an integrated design strategy addressing both form and performance throughout the design process. Prerequisites: Environmental Systems I & Building Systems I.
A46 ARCH 4391 Environmental Systems II: Acoustics
The Acoustics Workshop is designed for students that have been partially waived from Environmental Systems II with the exception of the acoustics portion. The workshop joins the Environmental Systems II class for only the lectures on the topic of acoustics. The class will cover the design of acoustic environments starting from the physics of sound, the design room acoustics, identifying noises sources, and investigating methods for noise mitigation.
Credit 1 unit.

A46 ARCH 439H Environmental Systems II (Mumbai)
We as architects have to analyze and address complex issues and relationships, synthesize them, and then make them manifest through clear design strategies. Building systems must reconcile solar heat gain, glare control, daylight levels, thermal insulation, ventilation, acoustics, air quality, structure and fabrication — all in relation to the scale and comfort of the human body. The development of environmental systems into a clear, comprehensive, and elegant design solution cannot be an afterthought; it must be a synthesized and integral part of the design process, with a clear strategy that operates at multiple scales. Building upon the passive strategies explored in Environmental Systems I, this course will lay the foundation for the integration of active environmental systems with enclosure, space, and the requirements for human occupation. This will be done through the study of climate, air, temperature, water, light, sound and energy. Each topic will be assessed against problems, principles, possibilities and potential. This course focuses on how important it is to consider active systems as part of an integrated design strategy addressing both form and performance throughout the design process. Prerequisites: Environmental Systems I & Building Systems I. Credit 3 units.

A46 ARCH 445 Building Systems
Building Systems will examine the performance and properties of building materials, both traditional and new, through an analysis of assemblies and related systems. Investigations of wood, masonry, steel and concrete and the integration of relevant building systems will provide the fundamental structure for the course. All systems will be investigated relative to their architectural purpose, impact on the environment, relationship to culture/context, technical principles and will also consider manufacturing, construction, our profession and the society in which we practice. Moreover, the course will also examine the performance characteristics of contemporary enclosure technology and explore the impact these technologies are having on design thinking. Although we will focus primarily on the aforementioned topics, we will also identify and consider the impact of other parameters on design and performance such as building codes, role of the profession, health and life safety, systems integration, sustainability and industry standards. The course strives to provide students with a sound familiarity and understanding of traditional building systems in wood, steel and concrete; as well as the skills necessary to represent these systems. The course also seeks to expose students to the material and poetic potential of these technologies related to the making of architectural environments.
Credit 3 units.

A46 ARCH 447A Structures I
Statics and strength of materials through beam and column theory. Loads are defined and states of stress are identified and analyzed. The context of structural behavior is identified and optimal structural behavior and material efficiency structural design is reviewed. Form-active, bulk-active and vector-active structural options are explored relative to the transference of load along the length of structural members. The course applies structural theory to the analysis and design of structural members — beams, trusses, arches and columns.
Credit 3 units.

A46 ARCH 448A Structures II
Continuation of Arch 447A with consideration of the effects of forces on structural members of various materials. Introduction to the design of structural members in steel, reinforced concrete and wood. Prerequisite: Arch 447A.
Credit 3 units.

A46 ARCH 452K The Ambiguity of Scale: Japan's Landscape Tradition
Modernist architects in Japan, particularly those associated with the Metabolist Movement, often used the term “niwa,” literally gardens, to describe their urban design projects. The city, land, and sea were both the setting and the object of design interventions. This course will examine the Japanese landscape tradition from antiquity to the 21st century. The approach will be interdisciplinary, using literature, art, religion, economics, and technology to inform us of how earth, water, air, winds, plantings, views, and architecture were seen and imagined in Japan during successive historical periods. We will look at the cyclical reconstruction of Ise Shrine that took place in 2013, canonical Zen gardens from Japan's early modern period, the advent of modernist landscape principles and techniques in the 20th century, as well as the influence of garden aesthetics on the development of architecture and urban design over time. This course is open to qualified undergraduates. It is also offered as a Methods seminar for undergraduates in the Architectural History minor and fulfills the History and Theory requirement for Master of Architecture students. The maximum enrollment for this course will be 12.
Credit 3 units.

A46 ARCH 452L The Japanese House
This seminar examines the Japanese house as a modernist idea as it evolved over the course of the 20th century, both within Japan and internationally. The single-family, "tofu-cutter" house came to define Japan's suburban, industrialized landscape in the postwar era, but the type historically emerged out of a certain modernist imagination of Japan's premodern architecture, as architects and critics such as Bruno Taut and Arthur Drexler projected their specific readings of shoin and minka architecture onto a mandate for contemporary practice. The seminar will investigate major strains of domestic architectural design in postwar Japan, paying particular attention to the formalist exercises of Shihoko Kazuo and technology-driven designs of Inebe Kiyoshi. More contemporary pursuits by SANAA and Atelier Bow Wow in materiality, transparency, smallness and urban complexities will also be covered. This course satisfies the History/Theory elective requirement.
Credit 3 units.
A46 ARCH 453A Aviation & Architecture: Air Terminal Design and Emergence of Airport Cities

As seaports and train stations were once hubs of commerce and trade, airports serve as vital engines to today's economy, linking cities and regions to the globalized economic landscape. Surrounding airports, entire cities are emerging both organically and in planned developments, building upon the business related to air travel with office parks, conference centers, hotels, entertainment districts and retail. This seminar will be structured in three parts. In the first part, we will examine the fundamentals of transportation architecture and the way air terminal design has developed. Starting as simple structures on an airfield in the 1920s, airports were designed as heroic modern structures from the 1940s to 1980s, ubiquitous terminals in the 1980s thru early 2000s, and most recently as regionally expressive terminals in the 21st century. Students will research, analyze and present case studies, mapping an understanding of the basic architectural components of air terminal design. In the second part, we will explore the rise of airport cities. Students will work in teams of two to research and analyze the planning, governance, impact and growth of airport cities. Sites we will study include developments around Singapore's Changi, Amsterdam's Schipol, London's Heathrow, Paris' Charles de Gaulle, and Chicago’s O’Hare. The third part of the seminar will allow students to select a topic of special interest that spans the scale of terminal design and airport cities. Students will initiate independent research to deliver a final paper and presentation on the topic of their choice related to aviation, transportation architecture and planning. Seminars will be supplemented with guest lectures and will be highly conversational. We will explore opportunities for site visits to both airports and airport cities.

Credit: 3 units. Arch: GACS, HT

A46 ARCH 453B Art and Architecture

From Ancient Greece to the Renaissance, architecture, painting, and sculpture were regarded as the principal fine arts. In later years, the visual arts were relegated to a separate sphere, independent from buildings and removed from the expediencies of use; however, these positions are perennially contested. How have the distinct positions of art and architecture in private and public spaces been articulated -- and unmade and reworked -- around imperatives such as education, economy, equity, or environment? When has the tension between art and architecture been a problem or a source of inspiration and origin of form? This seminar looks at selected models and the situations, ideologies, and concerns that attended or motivated them. Examples will be drawn from Ancient and Classical periods to the present.

Credit: 3 units. Arch: GARW, HT

A46 ARCH 454A Urban Books

Since the beginning of the 20th century, art, architecture, and urbanism together have investigated the production of images that shape the symbolic dimension of our experience of large cities. The main goal of this course is to critically embrace this tradition through the format of the artist's book. St. Louis is the focus for our observations because it is familiar to our everyday lives and also because it provides key situations for understanding contemporary forms of urbanity and how urban space is produced and imagined. The course bridges the curricular structures of art and architecture by enhancing the collaboration between the practical and scholarly work developed in both schools, with additional support from Special Collections at Olin Library. It combines the reading, lecture, and discussion format of a seminar with the skill building and creative exploration of a studio. This course is divided into three progressive phases of development: The first consists of weekly readings, discussion, and responses in the form of artist's books. The second phase focuses on the Derive with physical activities and assignments based on interacting directly with the urban environment. The third phase focuses on individual research, documentation, and final book design and production.

Credit: 3 units. Arch: GAUI, UI Art: CPSC, FADM EN: H

A46 ARCH 455A Urban Design Sprints

In this course, students will provide scoping, phasing, programming, and conceptual design for small-scale yet pressing projects. Students will work through selected projects for community members and small organizations. Working over seven weeks in workshops structured to clarify community projects and move them forward, students will learn community engagement, facilitation, and communication skills in addition to practicing research, representation, and design skills. This course is open to upper-level undergraduate students and graduate students of all levels.

Credit: 1.5 units. Art: CPSC
A46 ARCH 456B Way Beyond Bigness...or Toward a Watershed Architecture

2015 marked the 10- and 20-year anniversaries of two seminal events that have challenged architects' relationships to large scale, complex societal issues: 1) the publishing of S.M.L.XI in October 1995 that featured Rem Koolhaas' manifesto of "Bigness" and 2) the landfall of Hurricane Katrina just outside of New Orleans in August 2005 that catapulted fields of design into an unprecedented post-disaster context. Students will reconcile these two disciplinary jolts by understanding these seemingly incongruous snapshots of history as jumping off points for new modes for architectural activism and opportunism. Students will design a manifesto, in newspaper format, for a future-based discipline of architecture that sails uncharted realms that are "Way Beyond Bigness." This will require the simultaneous submersion and assertion of architecture within other disciplines; the formulation of alternate modes of representations for emerging practice-based models; the blurring of academic and professional agendas in the urgency of activism; and the integration of multiple scales, interest groups and agendas in ridiculously complex and antagonistic situations. Underpinning Bigness and Hurricane Katrina will be additional case studies, guest lectures and field trips that cover: CIAM and the emergence of urban design; Koolhaas' thesis and OMA's early practice; mega-scale urban renewal projects in St. Louis; contemporary investigations into territorial scales of design; and multiple scales of contemporary, integrated Water-based designs, post-Katrina efforts and beyond. This course fulfills the History/Theory Case Studies elective requirement. Credit 3 units. Arch: GAMUD, GAUI, UI Art: CPSC

A46 ARCH 457B Segregation by Design: A Historical Analysis of the Impact of Planning and Policy in St. Louis

This transdisciplinary seminar, bridging humanities and architecture, introduces students to research, theories and debates currently being conducted on issues of segregation, urban policy and sustainability. By placing these debates in a historical and local context students will discover how policy and decisions are entrenched with racial, cultural, physical and socioeconomic segregation, and create the spatial transformation of America's divided cities. Students will learn to evaluate and analyze policy and planning through the framework of Triple Bottom Line Sustainability to understand the physical manifestation of segregation during growth and decline. CET (https://gephardtitstitute.wustl.edu/for-faculty-and-staff/community-engaged-teaching/) course. Credit 3 units. Arch: CAST, GACS Art: CPSC EN: S

A46 ARCH 457C Radical Mapping

Maps are instruments of power. We have seen this, for example, in the racially motivated "redlined" maps that legitimized urban clearings of entire neighborhoods in American cities during the 1930s. However, maps are also instruments of resistance, for visualizing lived experiences, and for critiquing political systems and relationships of power. Maps are tools for pinpointing accountability. This course will introduce students to the agency and potential of maps and mapping, which is a skillset that all designers need in the face of our current moment of social and environmental justice collapse -- a moment that has long been occurring. The course will cover interdisciplinary theories of mapping, critical cartography, and visualizing power as students build an "atlas of spatial politics" centered on Ferguson, Missouri, and the surrounding St. Louis region. This atlas will build on a body of work already underway that together is likely to culminate in a publication. An introduction to GIS software and data sources will be provided, and basic knowledge of Adobe Illustrator drawing software is necessary. Credit 3 units. Arch: GAMUD, GAUI, UI Art: CPSC

A46 ARCH 462H Information Modeling for sustainable Design

This course will focus on the principles of sustainable design as examined through Building Performance Analysis (BPA) and applied Building Information Modeling (BIM) methodology. The foundation for this course will be an introduction to BIM and BPA and the significance of both for the future of sustainable architectural design practice supported by analytical modeling. This emphasis on the suitability of building modeling for analytical purposes and on the interpretation of such data will provide the basic knowledge necessary for the second phase of this course, in which students will use a previous or current studio project for an in-depth study of their building's performance in the context of its chosen site. Exploring the interaction between the simulated environment (climate, isolation) and the virtual building with its physical characteristics (materials, assemblies, passive design strategies, heat transfer, daylighting, embedded energy), we will attempt to confirm and test the principles of sustainable design at the schematic level of project development. The model analyzed by each team will provide sufficient comparative information for a design approach whose desired goal is carbon neutrality in the lifecycle of the building. Students will be encouraged to investigate the suitability of analytical modeling software, in the context of critical design methodology. Prerequisites for this course are a basic understanding of BIM methodology and insight into sustainable design practices. Fulfills Digital elective requirement. Credit 3 units.

A46 ARCH 462M Pattern Recognition

Interrogates a recent history of architecture replete with pattern. Case studies of patterning in contemporary projects are undertaken through the production of analytical, computational models to reveal an underlying logic of performance and construction. In parallel, the course presents a theoretical survey of related issues in art, psychology, computation and ecology. In this context, pattern is understood as a performative expression of an ecological system, distinct from historical issues of ornament and representations. Informed by the analysis, students then digitally produce an original pattern, both graphically operative and spatially materialized. Credit 3 units.

A46 ARCH 462N Constructing Ideas

Constructing Ideas is about creating design concepts and transforming these into built architecture. We will learn how conscious imagination and coherent interventions lead us to ideal realities. This class examines the design and construction process as academic research. We consider the practice of making architecture as a synthesis of analysis, interpretation and transformation. Studies will teach us how a building idea influences its construction and how the knowledge about construction can become the starting-point of an idea. Interrogating design problems and investigating existing typologies as a methodology will lead us to specific answers. We will explore conceptual-artist practices and examine their strategies, learning to lead with intent, play with parameters and question the givens. From there, we will look at examples
of Swiss architecture whose early integration of construction in the design process has a long tradition. One could say that the bearing itself gets designed in Switzerland. We will consider invisible structures and material specificity. Learning this language gives us the ability to transform our ideas into specific architectural expressions and precisely tailored solutions. The form of the seminar is experimental. We consider our meetings to be spatial and contextual interventions, precisely designed like architecture. Sessions will vary, from a lecture to an exhibition, talks, a dinner — the goal is to be very conscious about what we are doing. This process is going to be documented through the whole semester. Each student will create his own design thesis and realize an installation that reflects it. The results will be exhibited and presented to the public.

Credit 3 units.

A46 ARCH 463B Emergent Urbanisms
This course surveys emergent models of urbanization in globalizing cities that thus far defy categorization or exist peripherally in studies of urban form. The goal of the course is to equip students with the theoretical and historical background, the analytical tactics, and the critical awareness necessary to reposition themselves as designers in these increasingly challenging contexts. Through case study examples and supporting readings, the course positions the formal, social and environmental effects of particular processes defining new urban spatial configurations in city-regions around the globe. Most of these processes are driven by discourses of “efficiency,” such that urban forms are increasingly inflected by economic operating systems, as they are subsequently detached from traditional concerns of livability and public interest. Emerging urban assemblages include: massive manufacturing warehouse landscapes or logistical distribution centers and “aerotropolis” transit hubs as well as those spaces left behind by regional restructuring: de-urbanizing (or deliberately erased) environments that contradictorily “enable growth” in other areas (or over the same areas); and the informal settlements that emerge more spontaneously on the margins of mainstream urban policy. Students use their understanding of these spatial and logistical configurations to project creative models for re-direction or engagement. Sources and analytical tactics are drawn from across fields including design, sociology, geography and history. Fulfillis Urban Issues elective requirement, MUD-Track elective requirement.

Same as A49 MUD 463B
Credit 3 units.

A46 ARCH 463C Invisible Cities
This graduate and advanced undergraduate seminar takes as a point of departure the famous 1972 Italo Calvino text that reframes a single city (Venice) as multiple cities, told through a sequence of discrete narratives and descriptions. Each of Calvino’s invisible “cities” reflect different emotional and physical environments and possibilities — or impossibilities — for their inhabitants, yet are all still connected through an overarching narrative. Invisible Cities, the course, builds on this premise that a city is not a one-size-fits-all experience (nor a monolithic construct with a uniform constituency), but instead is composed of radically different environments all selectively accessed, depending on one’s positionality or relationship to urban redevelopment processes. In places like St. Louis — but in fact in all American cities — residents live out different urban realities or imaginaries, with unequal access to the same services, provisions and processes. A highly visible instance of this occurs along Delmar Blvd in St. Louis where two contrasting lived experiences play out in neighborhoods across from each other on the north-south divide. However, this class posits that much less visible instances of the duplicitous city also exist, in spaces not geographically divided, but (more insidiously) overlaid. The course will focus on this conceptualization of inequality where both privileged and underserved populations co-exist in much more intertwined ways. Within any given block, neighbors live according to different opportunities, for education, health access, police services, or routes to property acquisition and financing. These are the invisible, spatially simultaneous cities; the urban realities that are much harder to see — at least to those who do not live those realities on a day-to-day basis. Like in Calvino’s world, urban and lived space is endlessly continuous and accessible for some; for others it is fragmented, even disorienting or opaque. This course will examine, frame, collect and document the various manifestations of invisibility together with the political instruments and policies that produce — and reproduce — it. We will use the St. Louis region as our primary focus, with comparisons to other sites. Our studies will involve a close re-reading of many of the mechanisms of daily governance and urban design such as policies, planning tools, legal, financial and real estate protocols and of course design decisions and processes; i.e., the apparatuses of urban redevelopment that exist right before our eyes. The seminar welcomes both graduate students and advanced undergraduate students from across disciplines. Support for Invisible Cities is provided by the Washington University in St. Louis Ferguson Academic Seed Grant Program granted through the Offices of the Chancellor and Provost and the Olin Business School. Fulfills Urban Issues and MUD Track elective requirement.

Credit 3 units. Arch: GAMUD, GAUI, UI

A46 ARCH 463D City Life and Urban Worlds: An Introduction to the Urban Humanities
The urban humanities is an inter-/anti-disciplinary project that brings together theory, practice, and methods from fields in architecture, urban design, and the humanities to interrogate the urban condition. In this core course, we will delve into key theorists, texts, and methods that inform the urban humanities through seminars, site visits, and design projects. We will debate emerging perspectives in critical urban theory and then explore the applicability of these positions in St. Louis through mapping, street ethnography, and subtraction. In addition, this seminar is designed to introduce urban scholars from across the humanities and design fields to each other. Participants will be encouraged to experiment, trade, and engage in dialogue across their fields. What, we will ask, is the status of the urban commons in an era of enclosures and privatization? What can postapocalyptic cyberpunk from Lagos teach us about “smart cities”? How do built environments get their politics? Can these politics be redirected or subverted?

Same as A49 MUD 463D
Credit 3 units. Arch: GAMUD, GAUI, UI Art: CPSC

A46 ARCH 464A Architecture and Photography
Seminar deals with issues raised by use of photography by architects, historians and critics. Seminar confronts the assumption that our knowledge of notable buildings and architectural space is based primarily on the photographic image. Photographs are tacitly accepted as objective facts, and the pervasiveness of photography in magazines, books and exhibits as substitute for direct experiences is rarely questioned. Goal of seminar: to foster a healthy skepticism of photographs, and to investigate the role of photography as a means of record and convey complex spatial conditions by
the ordering conventions of the frame. While not technical, the course introduces students to technical aspects of photography that are particularly relevant to architectural photography: parallax, lighting, lens distortion, depth of field, format and grain, cropping, photomontage and point of view. Fulfills history/theory requirement.
Credit 3 units.

A46 ARCH 465C Art, Design and Entrepreneurship: Creative Placemaking Beyond The City
This course invites students from diverse areas of interest to engage with the cultural landscape of Marion County and Hannibal, Missouri—a region that, through the work of Mark Twain, popularly epitomizes both rural life and the allure of the Mississippi River. While a quarter of a million tourists visit this area each year to follow in Tom Sawyer’s footsteps, the work of local artists, designers and entrepreneurs is innovating the narrative of this place and opening up room for consideration of African-American experience, local food systems, and the complex series of social and economic connections within life along the Mississippi. This course puts that spirit of collaboration and imagination in the hands of students, challenging them to think beyond the borders of their disciplines to create projects that present new connections between place, community and culture to both rural and urban audiences. The National Endowment for the Arts defines creative placemaking as an opportunity when “public, private, not-for-profit, and community sectors partner to strategically shape the physical and social character of a neighborhood, town, tribe, city, or region around arts and cultural activities.” Through fieldwork, research and idea-creation, students collaborate with mentors on the ground to create locally appropriate projects that address questions of culture and design in the region. Occasional off-campus visits are joined in the classroom to a wide range of readings, case studies, and webstreamed conversations with national leaders across fields. The course concludes with small teams designing a specific plan, event, or project that could later be implemented in the community.
Credit 3 units.

A46 ARCH 467A Disappearing Act
What does erasure make, and how might we reconstitute what has been lost? This seminar will explore the architecture of ghosts: things thought to be lost or destroyed, or which can no longer be accessed. This representation-forward class will test a range of drawing and making techniques in various media and scale to foster a dialog about what drawing misses and the presences and absences of the built environment. We will frame our work and ideas in architectural discourses of subtraction, palimpsest, and productive removal. Our work will capture the dynamism and logic of the built environment.
Credit 3 units.

A46 ARCH 470G Edges of Privacy
In the built environment, we are bound to come across each other. Throughout history, different forms of mediation between public space and the private realm of dwellings have evolved. Some models encourage interaction between diverse people. Other models, such as gated communities and housing enclaves that cater to specific groups, support interaction between similar people, forming networks of sameness while seeking separation from the “other.” Other models are disengaged from notions of community by accessing secluded individual dwellings directly from the street by car. In dense cities, private dwellings are typically separated from passers-by by occupying higher levels from the street, while in mid-density areas, this is often achieved by low walls, steps, small gardens, balconies, stoops, or half-basements. In the suburbs, there is a greater separation from strangers through private lawns, half-levels, fences, steps, porches, and other implied physical (or sometimes legal) boundaries. It is in collective housing where the interactions between neighbors—and sometimes strangers, depending on the scale of the building—occur in tight spaces of shared access. Contiguity to the private rooms of the dwelling is extreme in hallways, walkways, stairs, and landings. Attention to accessibility impedes solving privacy issues with levels, while stacking and double-loaded corridors—ways of achieving affordability—challenge alternative forms of intermediate spaces between entry and the private dwelling. Many architects have been experimenting with open walkway access types in collective housing beyond using them as an economical and pragmatic means of circulation. Walkways can become expanded (conceptually and physically) places along edges of privacy to mediate between potential scenarios of conviviality and conflict, a necessary opposition to reconcile through precise design to create housing for diverse people instead of segregated enclaves for people with similar cultural habits. Solutions for expanded edges often double as climatic buffers to reduce building energy demands. In this seminar, which is open to both undergraduate and graduate students, we will analyze some of the most compelling examples of open walkways in housing from around the world, including both historic and contemporary successes and failures. Through the research and drawing of selected case studies, we will unpack modes of interaction and the potential for this access type. If mediation between strangers and private space is successful, the idea of collective housing as a socially and environmentally sustainable model of living can be an attractive and successful alternative in support of a walkable and open city.
Credit 3 units.

A46 ARCH 471A Continuity and Transformation
Throughout history and across cultures, certain ideas, concepts and organizational strategies have persisted in architecture, despite advances in social ideals and technological capabilities. The seminar explores the phenomenon of this continuity with the goal of uncovering the manner in which these ideas and strategies are transformed. Whether classified by use, characteristic form or compositional device, the continuity of these notions is clearly traceable as a body of knowledge waiting to be revealed, understood, assessed and, when valid, built upon. The transformation of ideas and strategies is one of the most fundamental activities of the designer, but relies on careful study. We discover evidence of this phenomenon in vernacular architecture, patterns of settlement and habitation, and in the work on many of our most influential practitioners, such as Le Corbusier, Kahn, Moneo and Zumthor, as well as in the realm of painting and sculpture including Cubism, Suprematism and Expressionism.
Credit 3 units.

A46 ARCH 472 Sustainable Development
This seminar is an introduction to the basics of small- to medium-scale development. It will begin with a series of introductory lectures covering the principles and tools of development, such as creating a project performa, basic tax credits, TIFs, and financial structuring of a project; exploring methods of implementing sustainable practices and designs into development-driven projects through marketability, cost-savings,
tax credits and other incentives; and investigating the process of real estate development through the use of sustainable ideas and practices in buildings. It will continue with a series of case studies in which the class will examine models of existing developers in terms of these base elements. Finally, students will be asked to develop a project in order to understand the architect-client relationship and how to stimulate recognition of the value and importance of sustainable design in real estate development.
Credit 3 units.

A46 ARCH 475D Landscapes Through Time: The History of St. Louis’ Built Environment
From the Mississippian mound builders to the urban conditions of the present day, this course will investigate the different approaches of various cultures to creating built environments that meet the needs of their time in terms of landscapes and structures. Using the City of St. Louis as an example, the course will examine the layout and infrastructure of the city at various periods, discussing the effects of technological changes in the creation of structures, improvements to transportation, facilitation of trade and the effects of these forces on the cultural and built landscape of the city. Each class session will discuss the structures and landscapes that defined individual eras in the history of the city, and the ways in which these were successful or unsuccessful. This course fulfills the History/Theory elective requirement.
Credit 3 units. Arch: CAST, GACS

A46 ARCH 475E History of the Modern Art Museum
This course explores the development of the modern art museum as an architectural type, measured against evolving nature of display objects, curatorial practices, and demands of the viewing public. Since the consolidation of the type in the early 19th century, the art museum has been the primary site where the symbiotic trajectories between artistic and architectural development have played out. Also to be examined is the importation of this program into non-Western countries, which responded with their own canons and classifications of fine art. The course ends with recent case studies where architecture has made new, often aggressive, commentaries on objects it is designed to display. The course is open to graduate students and advanced undergraduate architectural history minors. Fulfills History/Theory elective requirement.
Credit 3 units. Arch: GARW, HT

A46 ARCH 484B Notations on Florentine Architecture
This seminar proposes a historical survey of significant buildings and urban spaces in Florence through the graphic documentation and spatial analysis of selected sites and buildings from antiquity to the Renaissance and to modernism. The general framework of our analysis is to understand the relationship between the historic development of the city and its most symbolic architecture. This approach is based on the work of Italian scholars, such as Giulio Carlo Argan, who define the history of architecture as the history of the city. The course is methodically divided into two blocks of exercises. In the first part of the semester, we focus on readings, site visits, sketches, analytical drawings and photos, as well as the mapping of the urban development of Florence. In the second part of the semester, students focus on the tectonic study of specific buildings through the construction of representational and experimental models. Each student’s individual work contributes to a collective 2D and 3D final project to be presented as an exhibition in the Florence Studio during the spring and to be shown at the College of Architecture in the fall.
Credit 3 units.

A46 ARCH 486A NOMA National Design Competition
This course allows students to work collaboratively to develop a comprehensive body of work (including presentation boards, physical models, and animated digital graphics) in response to the National Organization of Minority Architects’ (NOMA) Barbara G. Laurie Annual Student Design Competition. Students work in pairs to develop thorough schematic-level solutions. After the midterm review, the class selects the strongest overall team project and uses that as a basis to develop highly detailed plans, elevations, sections, details, 3D views (animation optional), cultural, sustainable, and accessibility design concepts. Not only does this activity culminate into a final review, but students submit and formally present their design solution at the annual NOMA (http://www.noma.net/) Conference. CET (https://gephardtinstitute.wustl.edu/for-faculty-and-staff/community-engaged-teaching/) course.
Credit 3 units. Art: CPSC

A46 ARCH 488 Architecture Service Learning Practicum
The Sam Fox School of Design & Visual Arts, the College of Architecture, and the Graduate School of Architecture & Urban Design are giving a problem-solving studio workshop about architecture, community, and the environment. Fourth through 10th-grade students from schools in the St. Louis Public School District will do 2D and 3D hands-on problem-solving projects, use the libraries and computer labs on campus, and be introduced to the field of architecture through lectures and discussions about design projects they will undertake. Washington University graduate and undergraduate students in architecture will participate in the important responsibility of being teaching assistants.
Credit 1 unit.

A46 ARCH 490 Architecture Service Learning Practicum
The Sam Fox School of Design and Visual Arts, College of Architecture and Graduate School of Architecture & Landscape Architecture & Urban Design, give a problem-solving studio workshop about architecture, community and the environment. Fourth through 10th grade students from schools in the St. Louis Public School District do 2D and 3D hands-on problem solving projects, use the libraries and computer labs on campus, and are introduced to the field of architecture through lectures and discussions about design projects they undertake. Architecture faculty member Gay Lorberbaum leads the curriculum.
Washington University graduate and undergraduate students in architecture participate in the important responsibility of being teaching assistants. CET (https://gephardtinstitute.wustl.edu/for-faculty-and-staff/community-engaged-teaching/) course.
Credit 2 units. Art: CPSC

A46 ARCH 490A Explore & Contribute: Collaboration Between Washington University & Henry Elementary School
Principal Esperansa Veal of Henry Elementary School is creating a remarkable place for her students who live in the neighborhood of the Cochran Gardens Federal Housing Project in downtown St. Louis. Principal Veal is clear in her conviction to provide each of her students with both literal and academic nourishment, and is working unceasingly to make the Henry School a safe...
and creative oasis for children ages pre-school through grade six. Her goal is to have the Henry Elementary School students explore sustainable ways to live during the 21st century. To this end, we will emphasize ecological sustainability, environmental health, personal responsibility, leadership and a comprehensive, high quality academic program. With an emphasis on the environmental sciences, energy alternatives and conservation, recycling, organic gardening and the food sciences, and the emerging "green" economy, students will focus on developing the math, science, writing, and hands-on skills that will make them successful leaders to make a difference in improving the environment for humanity. This course invites undergraduate and graduate students from different fields of study to apply their discipline to the goal of designing and teaching hands-on problem-solving projects for students at the Henry Elementary St. Louis Public School, located across the street from Cochran Gardens Housing, at 1220 N. 10th Street. Gay Lorberbaum, with advising from Principal Veal, will work individually with each Washington University student to develop the right fit between the creative contribution each Washington University student wants to offer and the vision Principal Veal has for each age group of students at Henry Elementary School. Students enrolled in this course will work on-site at Henry Elementary School during the scheduled meeting times. The will be an additional meeting on campus for one hour on Wednesdays at a time to be determined later by the enrolled students. CET (https://gephardinstitute.wustl.edu/for-faculty-and-staff/community-engaged-teaching/)

A46 ARCH 4930 In\Visible St. Louis: People, Place, and Power in the Divided City
This course approaches the study of segregation and inequality in St. Louis as deeply relational and contextual -- that is, embedded in a particular space and place and constituted through social-political relations. Students will be immersed in the history, theory and contemporary academic debates surrounding inequality, segregation, and social justice initiatives in urban cities across the United States. The course pairs this theoretical base (conceiving of segregation as multifaceted and durable, historical, spatial, and interpersonal) with intensive research experiences drawing on the methodological tools available across sociology, urban design, and architecture (archival research, data collection, mapping, diagramming, interviewing). Students will initiate collaborative research projects aligning with the needs of local organizations that serve the city’s historically disadvantaged populations. Local guest speakers (scholars, community leaders, residents) will enhance students’ classroom learning, as will site visits and other discussion formats. This interdisciplinary course bridges the Department of Sociology and the Sam Fox School of Design and Visual Arts, a collaboration supported by The Divided City initiative.
Same as I50 INTER D 4930
Credit 3 units. A&S IQ: SSC, SC BU: BA EN: S

A46 ARCH 499 Senior Capstone in Architecture
The Senior Capstone in Architecture allows undergraduate students in their final semester of study to pursue individual research projects. All students will participate in shared discussions and presentations, as well as pursue a highly individualized line of research inquiry that potentially starts where a former project left off, supplementing current or previous course work, or investigating a previously unexplored route. The course will culminate in a presentation and defense of a well-articulated and developed research project.
Credit 3 units.

Landscape Architecture


A48 LAND 401 Landscape Architecture Design Studio I
This core studio explores design principles common to architecture and landscape architecture as well as their own specificity. A series of problems focuses on the relation of component to space through conceptual, analytical, formal and perceptual investigations.
Credit 6 units.

A48 LAND 402 Landscape Architecture Design Studio II
In this core studio course, students develop a spatial understanding of landscape architecture through a series of exercises of varying scale and complexity. Building design skills incrementally, students acquire facility with the manipulation of ground plane and the elaboration of vegetation and material strategies at both site and urban scales. The studio fosters an appreciation of landscape architecture as a systemic construct with formal, ecological and social implications.
Credit 6 units.

A48 LAND 421 Landscape Representation I: Hand Drafting, Drawing and Sketching
The beginning course in the representation sequence introduces students to freehand and mechanical representation as a means for developing and communicating design ideas. Students build a basic understanding of orthographic drawing typologies and traditional drawing materials. Emphasis is placed on development of observational skills, building a design vocabulary, basic drawing skills, and the techniques of landscape architecture and architectural representation.
Credit 3 units.

A48 LAND 423D Videography for Designers
This seminar course examines the practice of capturing, producing and analyzing moving images as a method of inquiry for design. We focus on the analytical and communicative qualities of time-based media (recorded sequences, video, slideshows, animation, simulation, remote sensing, etc.) as a human-landscape intermediary that has the ability to alter understanding and evaluation of the environment. We explore techniques from a range of disciplines — art, design, sociology, anthropology, etc. The course meets weekly for brief lectures/presentations to direct our inquiries, discussion of foundational readings and ideas, media workshops, screenings, local field trips, and/or student presentations of work. Throughout the semester, students generate brief, exploratory work that focuses on methods and techniques, and a larger, final project that engages the themes of the course. Open to all graduate and upper-level undergraduate students, a goal of the course is to
blur boundaries between art and design, and to capitalize on their various approaches. No experience with video, animation or other software is required — only the desire to explore and incorporate time-based methods into individual processes. Credit 3 units.

A48 LAND 423E Cinematic Landscapes: The Making Of Watch movies. Talk about movies. Analyze the making of movies. Make a movie. Climate-themed movies. Post-apocalyptic movies. Meet in technology. Learn to scientifically use drones. Learn to scientifically use LiDAR. Use these tools in your climate-themed movie. Sculpt stories in time, supported by sound. This course will focus on the analysis of landscapes and cities as portrayed by popular cinema. How eidetic portrayals of nature and cities are circulated by popular cinema. Stories through which the values, common referents, public concepts, and memes of a culture materialize through the construction of movies. Interior to the semester there is an interdisciplinary workshop. Four-day fieldwork with Geology Assistant Professor Alex Bradley. Map and produce digital representations at 2-cm resolution of a mountainside scoured by a burst reservoir. This class is divided into three parts: watch, learn, and make. Watch: Each week, students will be asked to watch one movie and one director's commentary, often referred to in the “bonus features” as “the making of.” Learn: Students will study the methods and techniques used to create settings, props, and storyboards in the service of a sound vision. Make: Students will synthesize digital and analogue time-based media tools (sound and video) to make a movie thematically based on climate change. Credit 3 units.

A48 LAND 430C Special Topics: Pyrocene In the last five years, cataclysmic wildfires have raged globally, burning hotter, faster, larger, and longer in California, Australia, the Amazon, and beyond. A firestorm of images -- frantic smartphone footage, smoldering drone shots, panoramas of orange haze -- has ushered a vision of an apocalyptic "new normal" into public consciousness. In 2015, the scholar Steven Pyne coined the term "Pyrocene" to describe our current "age of fire," defined not only by the accelerated burning of living landscapes but also "lithic" ones, in which the spectacle of the fire crisis can only be understood in relation to deeper climatic and cultural transformations produced by fossil fuel combustion. This interdisciplinary seminar will explore avenues for architectural and cultural practice in the Pyrocene, which some scholars have called the "arts of living on a damaged planet." Approaching wildfire as a phenomenon at the intersection of landscape and urbanization, the course will center design disciplines but also develop robust connections to political ecology, eco-aesthetic art, decolonial anthropology, eco-poetic literature, and ecologically oriented philosophy. Drawing from readings and case studies in various fields, students will experimentally develop projects that traverse diverse critical frameworks for understanding, shaping, inhabiting, and tending contemporary fire landscapes. Credit 3 units.

A48 LAND 430E Special Topics: Solar Decathlon Landscape Strategy A solar decathlon house is currently being designed and constructed by Sam Fox architecture students for entry into the 2017 competition to be held in Denver, Colorado. This summer landscape architecture studio will develop the design and construction drawings for the high-performance landscape system that sustains the house. It will provide energy, light, water and food. Credit 3 units.

A48 LAND 452K The Ambiguity of Scale: Japan's Landscape Tradition Modernist architects in Japan, particularly those associated with the Metabolist Movement, often used the term "niwa," literally gardens, to describe their urban design projects. The city, land, and sea were both the setting and the object of design interventions. This course will examine the Japanese landscape tradition from antiquity to the 21st century. The approach will be interdisciplinary, using literature, art, religion, economics, and technology to inform us of how earth, water, air, winds, plantings, views, and architecture were seen and imagined in Japan during successive historical periods. We will look at the cyclical reconstruction of Ise Shrine that took place in 2013, canonical Zen gardens from Japan's early modern period, the advent of modernist landscape principles and techniques in the 20th century, as well as the influence of garden aesthetics on the development of architecture and urban design over time. This course is open to qualified undergraduates. It is also offered as a Methods seminar for undergraduates in the Architectural History minor and fulfills the History and Theory requirement for Master of Architecture students. The maximum enrollment for this course will be 12. Same as A46 ARCH 452k Credit 3 units.

A48 LAND 453 Advanced Planting Design This course focuses on both the cultural, environmental, scientific and the technical aspects of planting design. The course is taught in three modular sessions: horticulture and the science of plants; typologies and design such as bosque, grove, glade, allée, meadow, wetlands, hedgerow, etc., and their origins in productive landscapes, application to contemporary landscape architecture; and the practical hands-on experience in the field with both design documentation to installation techniques. The course offers several field trips to experience urban revitalization, various design typologies, sustainable land use, reclamation and restoration. Credit 3 units.

A48 LAND 480B Mapping the Metropolitan Mississippi This seminar explores the relationship of city to river through reading, recording and mapping. Students document their research, create proposals and develop simulations and/or prototypes for a site on the St. Louis riverfront. Methods of inquiry combine hand-recording, photography, GIS techniques and DIY devices. The course alternates discussion sessions, field research and lab. Open to all graduate students; undergraduates require the instructor's approval. Credit 3 units.
A48 LAND 483A Emergence in Landscape Architecture

This course investigates the roles of emergence theory in landscape architectural discourse. For the purposes of the course, emergence is considered as the development of new and/or different conditions as a result of disturbance. Disturbance can take many forms, and the phenomena that are subject to disturbance are many and varied. Landscapes are continually disturbed by social, economic and physical irruptions, but cognitive structures, perceptual frameworks and cultural values are also subject to turbulence that, as with landscape disturbance, often leads to innovation, novelty and resilience. The course explains what emergence theory is, where it comes from, how it relates to environmental design in general, and how it has — or could — change the way we design human and nonhuman inhabitations. Through readings, presentations and discussions, students are able to connect the rise of emergence theory in cultures of contemporary thought to its application in practice. The main theme of the course is the potential for emergence theory to enable us to relate qualitatively different modes of existence (human; nonhuman) to each other and through the connections thus established improve the lifeworlds of all. The structure of the course is based around ten key concepts of emergence, as follows: open systems, situation, initial conditions, assemblage, nature cultures, difference, field theories, disturbance, morphogenesis, formless. Each student investigates one of these concepts and presents their findings to the class.

Credit 3 units. Arch: ECOL