

School of Design Courses

About Course Numbers:

Each Carnegie Mellon course number begins with a two-digit prefix that designates the department offering the course (i.e., 76-xxx courses are offered by the Department of English). Although each department maintains its own course numbering practices, typically, the first digit after the prefix indicates the class level: xx-1xx courses are freshmen-level, xx-2xx courses are sophomore level, etc. Depending on the department, xx-6xx courses may be either undergraduate senior-level or graduate-level, and xx-7xx courses and higher are graduate-level. Consult the Schedule of Classes (<https://enr-apps.as.cmu.edu/open/SOC/SOCServlet/>) each semester for course offerings and for any necessary pre-requisites or co-requisites.

51-101 Studio: Survey of Design

Fall: 10 units

Students will conduct activities that will help them notice design in the world, investigate how it works, and describe their thinking about design, through photography, video capture, sketching, note-taking and modeling. They will work through projects in various ways as a means of 'testing-out' and reflecting on command design approaches. This course is for undergraduate design majors only.

51-102 Design Lab

Spring: 10 units

Introduce concepts and methods to familiarize students with a range of analog and digital modes of working across products, communications, and environments. Students will use desktop modeling and comping methods to familiarize them with a range of basic materials to build confidence in using and manipulating material to represent ideas. This course is for freshman Design majors only.
Prerequisite: 51-101

51-121 Visualizing

Fall: 10 units

This course introduces basic drawing and sketching techniques including figure-ground translation, 2 pt perspective construction, storyboarding for explanation, diagramming for clarification, field notation for recording through guided exercises, demonstrations, and short projects.

51-122 Collaborative Visualizing

Spring: 10 units

This course introduces frameworks of notational, exploratory and explanatory sketching using collaborative methods and exercises to cooperatively communicate design ideas. This course is for undergraduate design majors only.
Prerequisite: 51-121

51-132 Introduction to Photo Design

Spring: 10 units

Using a digital camera, students learn how to extend their 'seeing' with the camera, both in the world and in a shooting studio. Through shooting assignments student will understand how to: deconstruct image meaning and aesthetic choices, construction of photographic meaning and aesthetics, an understanding of color and how color delivers meaning, how a photographic studio works, proper digital photographic workflow and contemporary trends in photography. Intended for Design Majors, or permission of the instructor.
Prerequisite: 51-101

51-172 Systems

Spring: 9 units

This course explores how to understand complex phenomena by creating models of interrelations between components. Students learn soft systems diagramming as well as the systems thinking associated with ecologies, integrative science and socio-technical regimes. Students also learn how to see design as a way of making interventions into leverage points in a system in order to transform its functions.

51-173 Human Experience in Design

Intermittent: 9 units

Design touches, and can profoundly affect, people's lives. But why? And how? This course begins with a broad definition of what design is (and can be). We'll see how design is about the process as much as it is about the final product. We'll look at how the end user interacts with what is designed. And we'll discuss how designers need to think beyond the actual artifact to what lies behind it. We'll touch on design theory, design practice, design responsibility and even some design history. And through a series of guest lectures, explorations of other designers' work, field trips, viewings, class discussions and projects, we'll try to determine just what design is and what designers do.

51-175 Design Studies: Place

Fall: 5 units

"Place" introduces you to place-based design thinking. It trains your senses to perceive all that is designed and sustains everyday human lifestyles, especially those infrastructures and services invisible to city dwellers in the built environment. In addition, you will recognize relations between natural and artificial worlds. Coursework covers methods to evaluate individual and collective environmental and social impact at a regional and local level through techniques that develop capacities to reveal dynamic relationships among elements.

51-176 Design Studies: Futures

Spring: 5 units

"Futures" frames design in a temporally-extended, systemic context. It offers essential perspectives, practices, and competencies that are increasingly called for as designers progress in their work and careers, and as the design field evolves to acknowledge its significant powers and responsibilities. You will explore numerous futures methods, which support designers through ideation and storytelling, problem-finding and framing, brief formulation, project coordination, and collaboration. Coursework includes engagement with readings and videos, hands-on creative workshops, and visual prototyping and sketching.

51-177 Design Studies: Histories

Fall: 5 units

Histories explores a plurality of design histories extending beyond the dominant, Anglo-European story of Design. Through a series of guest lectures, critical readings, and offsite explorations, you will expand your understanding of histories, which evolve and change over time in the context of broader social, technological, environmental, economic, and political developments. Coursework includes exploring, developing, and documenting diverse historical perspectives of a research interest of your choice. Final projects will culminate in a presentation of student work.

51-178 Design Studies: Experience

Spring: 5 units

Experience explores how design touches peoples lives, and shapes their materials and non-material worlds. Through a series of lectures, viewings, and class discussions, we'll try to determine just what design is and what designers can do. We will explore contrasting definitions of design, and get to know it as an experientially-rich process. We'll examine how users and audiences interact with what is designed, and debate the designers responsibility to consider what lies behind it. Coursework includes individual and team projects exploring design's role in shaping our experience of the world.

51-201 Communications Studio I: Understanding Form & Context

Fall: 9 units

Giving form to messages and information using type, color, and images will be the focus of this introductory studio in Communication Design. Understanding the connection between content, intent, and form will be the goal of every project and exercise. Principles of hierarchy, chunking, sequence, clarity, and visual voice will guide work for the screen and the printed page, in dynamic and static forms.
Prerequisite: 51-102

51-203 Prototyping Lab I: Communications

Fall: 9 units

Learn the core methods and tools of visual communication design, with a focus on Adobe CC: particularly InDesign, Illustrator, Photoshop, Prototyping tools, and After Effects. The learning of software ideally will align with the activities conducted in the Communications Studio. This is a requirement for Design sophomores studying Communications.

51-208 Research Methods

Spring: 4.5 units

Learn how to select, conduct, and develop appropriate research methods for understanding and discovering contextual information and behaviors of human participants.

51-211 Products Studio I: Understanding Form & Context

Fall: 9 units

This course takes students through a progression of exercises and projects that investigate how object forms can relate to people through reasons of looks, feel, function, make, and preference. The understanding of context plays a role as the system of internal and external factors and conditions that cause people to interact a particular way through how they recognize, handle, move, and perform activity with the form and material of an object. Drawing and physical modeling become essential tools for the planning, development, and communication of these ideas.

Prerequisite: 51-101

51-215 Making Short Films

Intermittent: 3 units

The objective of this course is to provide students with a practical, technical and theoretical foundation in video work. Students leaving this class will have gained knowledge of developing a moving picture from start to finish. Students will learn storyboard, plan, production, and post-production video. Equally importantly students will start to develop their own visual aesthetics in the creation of 1 short moving pictures. The primary software for this course is Adobe Photoshop, with which students will explore construction, combination, manipulation, input, and output of video as a means of narrative creation. This Micro course will run between 5-6 weeks. The instructor will fly into Doha for a short period of face-to-face classes, centered around a Saturday. Enrolled students should expect two 90-minute face-to-face classes during the week before or after this Saturday date, as well as four 90-minute evening (6-7:30 pm) video classes over the duration of the Micro course (typically two before the campus visit, and two after, although instructors can change this). Specific dates will be confirmed in the syllabus closer to fall semester.

51-221 Color for Communications, Products, Environments

Fall: 9 units

This course will explore the fundamentals of color through the implementation of various media as they apply to their use in communication and expression in design. While this course does not deal with color theory per se we will spend time on the causes and effects of color interaction, color contrasts, color harmonies and color strategies for the effective use of color in our visual design work. We will use both nature and man made constructs to discuss how color affects what we see and its effect on our visual world. Short exercises and longer- term projects will be the vehicles of our explorations. This course is for Sophomore Design Majors.

Prerequisite: 51-122

51-223 Color for Communications & Products

All Semesters: 9 units

This course will explore the fundamentals of color through the implementation of various media as they apply to their use in communication and expression in design. While this course does not deal with color theory per se we will spend time on the causes and effects of color interaction, color contrasts, color harmonies and color strategies for the effective use of color in our design work. We will use both nature and man made constructs to discuss how color affects what we see and its effect on our visual world. Short exercises and longer- term projects will be the vehicles of our explorations. This course is for Sophomore Design Majors.

51-225 Communications Studio I: Understanding Form & Context

Fall: 9 units

Giving form to messages and information using type, color, and images will be the focus of this introductory studio in Communication Design. Understanding the connection between content, intent, and form will be the goal of every project and exercise. Principles of hierarchy, chunking, sequence, clarity, and visual voice will guide work for the screen and the printed page, in dynamic and static forms.

Prerequisite: 51-122

51-227 Prototyping Lab I: Communications

Fall: 9 units

Learn the core methods and tools of visual communication design, with a focus on Adobe CC: particularly InDesign, Illustrator, Photoshop, Prototyping tools, and After Effects. The learning of software ideally will align with the activities conducted in the Communications Studio. This is a requirement for Design sophomores studying Communications.

51-228 Communications Studio II: Designing Communications for Interactions

Spring: 9 units

At its most basic level, Communication Design conveys ideas and translates concepts into visual form. This form needs to be such that an audience will want to look, engage and (hopefully) learn. To get there, you will need to develop your process. Your own unique path. This is not easily done. It's also not prescriptive. There isn't one defined straight path. It's more like a wild and crazy zig-zag. A goal of this course is for you to give yourself permission to wander beyond the areas you're comfortable with to not be afraid of stretching beyond where you think you may be capable. And to develop your own individual process. We will work on a series of four print-based and interactive projects. You will broaden your understanding of color, scale, hierarchy, typography, grid systems and how to make things that both communicate and resonate with your audience. Everything we design is an opportunity to make work that is compelling, memorable and moving. This is a required course for all SoD Sophomores who are pursuing the Communications track.

Prerequisite: 51-225

51-229 Digital Photographic Imaging

Fall: 9 units

The objective of this course is to provide students with a practical, technical and theoretical foundation in digital imaging. The primary software for this course is Adobe Photoshop, with which students will explore construction, combination, manipulation, input, and output of image as a means of narrative creation. Through project critique and other discussion, we will also consider the aesthetic and political implications of the emergence of this and other new electronic imaging technologies.

51-231 Calligraphy I

All Semesters: 9 units

Working with pure unadorned Roman letterforms, this course introduces students to the theory and practice of hand-generated letters, employing a variety of mark-making tools. This course provides an in-depth understanding of the basic principles and techniques of the art of formal writing. Rhythm, texture and composition are achieved through routine, elementary exercises using geometric forms, demanding concentration and manual discipline with the development of hand-eye coordination. The function, use, and harmonious sequencing of letterforms is taught through weekly projects. Awareness of rhythm, texture and letterform structure is achieved through routine exercises. Drills, demonstrations, discussions, individual and class critiques are on-going. Additional related topics and activities introduced in class include books: binding and design. A brief introduction to the historical development of our Western alphabet is provided through film, slides, demonstrations, with discussion of twentieth-century type designs. Students also gain exposure to letter vocabulary, paleography, monographs, words and punctuation, classical page design, publication design-past and present, and calligraphy's role in design today. Thinking with hands and eyes, the manual placement and spacing of letters practiced in this course awakens sensitivity and judgment in the designer.

51-232 Calligraphy II

All Semesters: 9 units

This course serves as a continuation and deeper investigation of topics explored in Calligraphy I, where students tackle advanced problems in calligraphy and lettering. The introduction of new hands is to be decided by the student and instructor. Prerequisites: 51231

Prerequisite: 51-231

51-236 Information Design

Fall and Spring: 9 units

This studio course focuses on teaching a basic visual design process from ethnographic research through ideation to finished artifact. Students will work individually and in teams to gain proficiency in applying specific design techniques to information design challenges. Students will attend lectures to gain new perspectives, engage in projects to learn through making, conduct readings to balance theory and practice, participate in critiques to verbalize their views and consider alternate perspectives, join in discussions to develop shared understanding, give presentations to communicate their thinking, and complete tutorials and learn software for additional insight.

51-239 Prototyping Lab II: Communications

Spring: 9 units

Program simple websites as a means of learning basic HTML 5.0 and CSS; prepare documents for digital and print production using Adobe InDesign, Illustrator, Acrobat; learn basics of UX prototyping
Prerequisite: 51-227

51-240 Design, Brands, & Futures: Service Design Approaches and Pivots

Intermittent: 3 units

This micro will introduce students to service design and help students develop skillsets and knowledge that will serve them in their particular area of study. This includes ways of analyzing existing businesses and services, empathizing with multiple stakeholders in a complex system, and developing ideas for ways that existing businesses and services could adapt and evolve to emerge from the pandemic more resilient. Students will also use the power of storytelling to develop presentations that communicate their ideas in compelling ways.

51-241 How People Work

Fall: 9 units

51241 How People Work: Human Factors (ID/CD Lab I) This course is a general introduction to the field of human-centered design and applied human factors. It centers on the understanding of physical, cognitive, and emotional human needs and desires, including methods employed to acquire this information and translate it into useful criteria for the design and evaluation of products. Lecture, discussion, lab exercises, and projects are employed. Required of all sophomore design students. Others admitted by permission of instructor only.

51-242 How Things Work: Mechanics and Electronics

Intermittent: 9 units

This course investigates the basic principles of mechanics and electronics. Through the combination of lectures, investigations, and lab experiments, students develop simplified representations of complex systems. The skills of freehand drawing, mechanical drawing and three-dimensional models are employed and developed during the project sequence. Instructor permission required for non-Design majors.

51-243 Prototyping Lab I: Products

Fall: 4.5 units

The course will consist of introductions, demonstrations and solutions to introductory aspects of SolidWorks. Forming foundation skills in CAD-based communication and problem solving will be emphasized.

51-245 Products Studio I: Understanding Form & Context

Fall: 9 units

This mini-semester course takes students through a progression of exercises and projects that investigate how object forms can relate to people through reasons of looks, feel, function, make, and preference. The understanding of context plays a role as the system of internal and external factors and conditions that cause people to interact a particular way through how they recognize, handle, move, and perform activity with the form and material of an object. Drawing and physical modeling become essential tools for the planning, development, and communication of these ideas.
Prerequisite: 51-102

51-247 Prototyping Lab I: Products

Fall: 9 units

The course will consist of introductions, demonstrations and solutions to introductory aspects of SolidWorks. Forming foundation skills in CAD-based communication and problem solving will be emphasized.

51-248 Products Studio II: Designing Products for Interactions

Spring: 9 units

This course provides essential methodologies for the conceiving, planning, and realization of three dimensional objects and is coordinated with the Prototyping Lab 2 course to provide for an experiential understanding of the relationship between designing and making. From an operational standpoint, this course gives primacy to the material object to probe its characteristics more deeply and to critically explore an object's role as part of the assemblage of interaction and experience. Students will develop three-dimensional visual literacy, emphasizing the relationship between form factors and overall visual/physical impact in service of supporting human interactions. Through a hands-on approach, this course covers the "how" and the "why" of product/object development through the primary lens of "design for interactions."
Prerequisite: 51-245

51-249 Prototyping Lab II: Products

Spring: 9 units

This course introduces students to high fidelity modeling techniques through a series of machines, processes, and or methods to simulate desired form, scale, and proportions.
Prerequisite: 51-247

51-251 Prototyping Lab I: Digital Prototyping

Fall: 4.5 units

The course will consist of introductions, demonstrations and solutions to introductory aspects of SolidWorks. Forming foundation skills in CAD-based communication and problem solving will be emphasized.

51-252 Design, Brands, and Futures: Design Thinking for Sustainable Change

Intermittent: 3 units

Design Thinking is a powerful process that expands creative potential and drives sustainable innovation. Work with CMU Design faculty and acquire powerful creative tools that you can immediately put into practice as an agent of sustainable change.

51-256 Design, Brands, and Futures: Designing Product and Service Identities

Intermittent: 3 units

In this course, students and I will delve into investigating social and cultural patterns both historical and contemporary which guide effective approaches to branding products and services. For example, what helps people feel happy, accomplished, confident? What do they wear? What do they eat? Where do they gather? What do they do for enjoyment? What do they value? Students will work to align their discoveries to the graphic forms, colors, typography, and taglines that they create as part of a comprehensive branding strategy, which they will base on a product or service of their own choosing. Students will achieve these goals by engaging in a creative process where they will sketch, iterate, test, and refine graphic symbols and typography using conventional paper and pencils as well as Adobe Illustrator. Throughout the course, we'll also discuss communication trends and the role technology plays in shaping how and where brands appear in our everyday lives. Based on what they learn, students will propose various forms that their graphic symbols may take and brainstorm contexts in which they may appear. For example, how might their concepts appear in motion in a video viewed on a phone, or on the side of a food truck? Through this process students will explore the affordances and limitations of various mediums and contexts and test the flexibility of the branding systems they create.

51-257 Introduction to Computing for Creative Practices

Intermittent: 10 units

This course is an introduction to Java programming for designers, architects, artists and other visual thinkers, using the popular "Processing" Java toolkit for interactive graphics. Intended for students with little or no prior programming experience, the course uses interaction and visualization as a gateway for learning the traditional programming constructs and the fundamental algorithms typically found in a first course in programming. Students will become familiar with essential programming concepts (types, variables, control, user input, arrays, files, and objects) through the development of interactive games, information visualizations, and computationally-generated forms. Because of limited space, only Design majors may take this course. Students following an IDEATE concentration or minor should register for 15-104.

51-261 Communication & Digital Design Fundamentals

Fall: 9 units

A one-semester course that introduces non-majors to the field of communication design. Through studio projects, lectures, and demonstrations, students become familiar with the visual and verbal language of communication designers, the design process, and the communicative value of word and image. Macintosh proficiency required. This course (or 51262) is required for Design minors.

51-262 Communication and Digital Design Fundamentals

Spring: 9 units

A one-semester course that introduces non-majors to the field of communication design. Through studio projects, lectures, and demonstrations, students become familiar with the visual and verbal language of communication designers, the design process, and the communicative value of word and image. Macintosh proficiency required.

51-264 Product Design Fundamentals: Design for Interactions for Products

Spring: 9 units

In this one-semester studio-like course non-majors are introduced to product design from the product designer's point of view. Through studio projects, lectures, and discussions, students will learn approaches to defining and visualizing product concepts for mass production. Case histories and the analysis of existing products will supplement hands-on experience in developing product concepts. This course is required for all Design minors.

51-265 Environments Studio I: Understanding Form & Context

Fall: 9 units

With our need for human, in-person connection laid bare during the pandemic, designing meaningful places for people to interact with one another, learn, explore, shop and work is more important than ever. This studio begins your journey as a designer of environments and experiences, as you learn the elemental strategies for designing narrative-driven spaces and experiences. You will develop your ability to think through the relationship between time, space, scale, materials, and atmosphere, while also considering how technology can open opportunities. You will use what you learn in Prototyping Lab 1: Environments and Narratives in Space and Time to develop both analog and digital high-fidelity artifacts that communicate your conceptual ideas and the interactive experiences you design. This course is a requirement for Design students who wish to study Environments during their time at SoD.
Prerequisite: 51-102

51-267 Prototyping Lab I: Environments

Fall: 9 units

Agility between 2D, 3D and 4D mediums is essential in the changing design landscape (e.g. AI, interactive spaces and media, extended reality). In this Lab, you will be challenged to prototype in both analog and digital ways, including low-fi prototyping, rapid making, high-fidelity laser cut scale models, Rhino and Unreal Engine 3D modeling and rendering, and Unity-mediated interactions. You will build your design agility and practical skills by moving between multiple ways of thinking, making, and presenting, becoming a versatile designer. This course is a requirement for Design students who wish to study Environments during their time at SoD.
Prerequisite: 51-102

51-268 Environments Studio II: Designing Environments for Interaction

Spring: 9 units

The courses Environments Studio II: Designing Environments for Interaction and Prototyping Lab II: Environments run in tandem to explore the spatiotemporal interactions between people, objects and spaces. In this course you will: engage critically and reflectively with key related theories and debates; establish and shape your own knowledge, understanding and position; and deepen your design literacy and contextual awareness; develop work that is tied to what is currently happening in the design field. This is a project-based studio, so you will learn through making, designing rich interactions and spatial experiences at different levels of scale within physical, digital and hybrid environments.
Prerequisite: 51-265

51-269 Prototyping Lab II: Environments

Spring: 9 units

In this lab, you'll experiment with ways that designers can craft spaces through collective, time-based, and distributed interactions. You will learn how to: represent environments using digital drawing tools, fabricate environments using computer-controlled machines, connect environments using code and electronics, and activate environments using motion tracking and gaming platforms. You will learn how to use these technologies but also-and more importantly-how to self-learn and problem-solve as current tools evolve and new ones emerge. In other words, through this course, you will become a maker with both the skills and mindset to help you succeed in your academic and professional careers in the years to come.

Prerequisite: 51-267

51-271 How People Work

Fall: 9 units

Introduction to human-centered principles of design, including physical, cognitive, and emotional human factors. Capacities and limitations of people affected by design are learned through the study of known principles and user research. The course is delivered through a series of combined lectures, readings, hands-on lab activities, and a team project applying human-centered field research methods and design.

51-272 Cultures

Spring: 4.5 units

Explore the sociotechnical aspects of the many identity based differences between people. These differences may be not only cultural, but also related to gender, age, class, race etc. The course will survey critical theories that are useful for understanding how difference both constructs, and is constructed, by systems, practices and things. Students will also explore different frameworks and strategies for exploring questions of difference, and to think critically around the ethical and political implications for design interventions.

51-277 Design Studies: Systems

Fall: 5 units

"Systems" prepares you to design for, and within, complex systems. You will make use of systems theory and experiment with systems-thinking techniques to interpret and illustrate how ecological, social, and cultural systems operate at different levels of scale. You will also learn to identify leverage points within a system, and design ways to intervene that creates openings for norms, behaviors, attitudes, and habits. Coursework includes exposure to theoretical frameworks, analysis of case studies, and complexity mapping projects to analyze and represent the world from scalar and systemic perspectives.

51-279 Design Studies: Cultures

Fall: 5 units

"Cultures" immerses you in ways in which societies shape design, and how design shapes societies in return, rooted in historical and philosophical origins of identities and cultures. We will explore various aspects of human difference and relate them to the designed, material worlds we inhabit. Coursework involves reflective practices to connect theoretical, personal, and contextual understandings of the themes exposed, to explore meaning, purpose, and values that represent you as a person and as a designer.

51-282 Design Studies: Persuasion

Spring: 5 units

"Persuasion" develops your capacity to put across your message, to get other people to understand you, to value your work, and to want to work with you skills that will be central to your career, both inside and outside of design. Understanding what persuades you and others how we are influenced by other people, by media, by technology, by our environment, by design is a critical skill to develop in better understanding yourself, your design practice, those around you, and society more widely. Coursework includes a series of persuasive, exploratory exercises including filmmaking and exhibition of speculative work.

51-284 Design Studies: Power

Spring: 5 units

"Power" explores the concepts of politics, the political, and the powers that intertwine with design. You will delve into the mesh conformed by plural forms of knowledge, wisdom, power, and designs. A deepening into matters of ideology allows us to think critically about how designed artifacts are the embodiment of ideology; having the power to influence what people think, and shape their aspirations, desires, and values. You will be exposed to emerging design practices and theories that harness the power of design for social change with sociocultural and ecological mindsets. Coursework includes facilitation of activities for the collective analysis of topics at the intersection of design and power.

51-305 Lab for Cybernetics: Engaging Wicked Challenges

Intermittent: 9 units

Cross Listed with Architecture 48-551 and 48-751 The Laboratory for Cybernetics supports students engaging with wicked challenges grounded in a thesis topic or personal project, by offering concepts and materials, models and methods, networks and collaboration. Cybernetics uniquely approaches systems in terms of purpose—the purpose attributed to the system and the purpose of those who articulate the system's purpose (see <https://tinyurl.com/L4C-Award>). Thus, Cybernetics demands explanations for system behaviors as well as responsibility for our own behaviors and the interventions we design. The course project is a design brief that is entered into a competition for a \$5K toward for implementation. The primary award criterion is to increase the total number of choices. The brief must articulate how the design increases the potential for human agency beyond existing approaches while affording an experience that is deeply resonant with the values and intentions of the persons engaged with it. See tinyurl.com/Lab4C-Spring25 for more details.

51-317 Publication

Intermittent: 9 units

For this course you will arrive on Day 1 with a story that you want to tell. You will then spend the semester iterating, designing, producing, publishing and, finally, putting your publication out into the world in a compelling, memorable and designerly way. Your publication can take the form of a substantial book, a series of smaller booklets or zines, a film, an interactive experience, a piece of public art, a combination of two or more of these or something else entirely. As long as it can be disseminated beyond the classroom and campus. This course will only work for those who have an idea. You must come into this course with a firm grasp of the story you want to tell, how you want to tell it and who you want to tell it to. There is only one project for this course. It will be robust and multi-faceted and you will only have 13 weeks to make it. So you need to be ready to go from the start. The first class will be dedicated to hearing your pitch for what you want to do. It will then be determined if you should stay on the roster.

51-318 Design Center:Community Rituals & Civic Ceremony: Building immersive experiences

Intermittent: 4.5 units

This course combines social games and physical techniques from public theatre with contemporary design practices in the immersive experience industry to examine group rituals and civic ceremonies from ancient Mesopotamian, Mesoamerican, and Asian traditions. Participants will create and perform original civic ceremonies that harness group energy to "enchant" their surroundings, their belongings, and each other.

51-319 Digital Photography in the Real World

Intermittent: 4.5 units

DIGITAL PHOTOGRAPHY IN THE REAL WORLD Photographers are active observers. They look until they see what they want others to see -then they compose and click the shutter. In this course students will walk streets with their cameras. They will learn how to use their cameras to better understand what they believe is important, beautiful, and/or intriguing in the world. They will also learn how to communicate their imagery to others through screen-based and print output. Assignments range from accurately describing reality, to showing aspects of life that should be improved, to making images for purely aesthetic reasons. There are two main goals to this course: learning the fundamentals of operating a digital camera and producing digital output; and, learning to become better 'seers' in the world. Students must own a camera but no prior photographic experience is necessary.

51-321 Design Center: Photographic Narrative

Intermittent: 9 units

Most photographs tell stories. We see photographs in newspapers, magazines, snapshot albums, on the web, in books, and in posters. In these contexts photographs often work with words to convey meaning, whether they are shown with captions, news stories, or just with titles. Photographs can work without words, too, to create purely visual narratives. In this course, students will make a photo narrative and determine how it will be seen. Students may make photo books, for example, or decide that their images will be seen digitally on screen. While students are making photographs, we will explore the rich traditions of photographic story-telling that range from the world-oriented work of photo-journalist W. Eugene Smith to the documentarians such as Walker Evans, Nicholas Nixon, and Alec Soth. We will look at photographers, too, who construct fictional worlds, such as Duane Michals, Cindy Sherman, and Gregory Crewdson. As students make their own narratives, we will look at the interplay between words and photographic images; how images are paced and scaled to create rhythm; how photographs are sequenced to tell stories; and other formal elements involved in creating visual narratives. 12-15 students. Prerequisite-a college level photography course.

51-322 Advanced Digital Imaging

Intermittent: 4.5 units

Building on the technical skills and methods of communicating narrative learned in Digital Imaging Advanced Digital Imaging takes communication to the next level of resolution with particular concern in artifact creation. Students explore historical and groundbreaking means of content delivery.

51-323 Communications Studio III: Designing for Complex Communication Systems

Fall: 10 units

Gain a greater understanding of how to craft communications that resonate with specific people by researching topics/audiences/contexts, by developing/iterating/testing concepts, and by investigating deeply the nuances of typographic form/image/sequencing of interactions; learn how to craft graphic form to express ideas that are not dependent on the reading of words themselves; continue to develop communication systems
Prerequisites: 51-228 and 51-225

51-324 Basic 3D Prototyping

Spring: 4.5 units

A half-semester laboratory mini-course introducing a range of materials, methods, and workshop techniques by which designers prototype designs in three dimensions. Basic competence in shop techniques is established by bringing to realization a series of simple artifacts. Studio and model shop tools are required; lab fee. For Design students only.

51-326 Communication Systems Design for Social Equity

Intermittent: 9 units

This course will take a systems approach to understanding issues related to social equity and justice and will explore the creation of effective communication strategies for specific audiences across a range of analog and digital platforms. In this class students will explore and discuss the meaning of "social equity and justice" and explore its many facets through 1) assigned readings and discussions; 2) research on the problem and the stakeholders affected by it; 3) and the design of a communication system. A review of communication design from historic social equity movements will introduce the course. Students will work in teams to select a social justice issue, and map both the problem and the stakeholder groups affected by it in order to identify target audiences for the communication system. Over the course of the semester, students will formulate content and messaging for use in a range of communications that work together as a system such as brief tweets and messages + images for online platforms, concepts for apps, brief videos as well as print applications such as posters, brochures etc. The final result will be a multi-pronged campaign to raise awareness and motivate action with respect to a social justice/equity problem. Class will meet once a week for 2 hours and 50 minutes. Students will be asked to work in Miro and other online collaborative platforms. This course will be offered remotely.

51-327 Design Center: Introduction to Web Design

Fall: 9 units

This class will introduce the basics of designing and building websites, the fundamentals of HTML5 and CSS3, and responsive design approaches to assist students in creating semantically sound web pages that can be viewed across a variety of platforms, devices and browsers. The class will help students understand the constraints and advantages of working with the web, with this course focused on technically pragmatic solutions for making websites. Students will also be exposed to content management systems and topics such as responsive web design, research, and information architecture. Upon completion, students will be capable of designing, creating, launching and managing their own web sites. Your own laptop is required, with the following software installed: Adobe CS6 or later, as well as other open-sourced software. This course is for Design Majors only, or by special permission of the instructor.

51-328 Design for Digital Systems

Intermittent: 9 units

Through tools and methods of user experience research and ideation, Design for Digital Systems uses web-based technologies to create functional prototypes for digital systems. Through demos, exercises, and a team-based trans-disciplinary project, students will use design thinking, industry-standard UX software, and code to identify, propose, and generate novel ideas for user problems. Students will learn advanced HTML and CSS, along with basics of database-driven web platforms using server-side technologies such as PHP and databases. The course is focused on screen-based interactions, but not exclusively so; it considers what technologies are viable today while leaning into the future to solve problems. Experience with HTML, CSS, and JavaScript is recommended but not required. This course replaces 51328 and 51828 Advanced Web Design. There may be a lab fee for non-design students.

51-330 Communications Studio IV: Designing Communications for Social Systems

Spring: 10 units

As the final course in a sequence of studio courses for Communication Design majors, this one builds on everything learned previously. Apply skills/knowledge learned in researching, developing, evaluating, refining communications to multi-faceted communication challenges that warrant the design of multiple communication pieces that span diverse mediums (in print and digital platforms) and function as a system; learn how to design for futuring (parts of the system yet to be determined) and for co-design where parts of the system are made for growth through contributions from audiences. This course is required of Communication Design majors in the School of Design.

Prerequisite: 51-323

51-331 Advanced Calligraphy I

All Semesters: 9 units

This course serves a continuation of study in the discipline of calligraphy. (It meets at the same time as Calligraphy I.) Students may take one of two directions in the course. (1) Enlarging their repertoire of scripts, contemporary or traditional, for use in limited areas of work such as book or display work, or (2) Concentrating on more intensive problem solving using a limited repertoire of scripts such as Roman, Italic, Sans Serif.

Prerequisites: 51232

Prerequisite: 51-232

51-332 Advanced Calligraphy II

All Semesters: 9 units

This course serves a continuation of study in the discipline of calligraphy. (It meets at the same time as Calligraphy II.) Students are encouraged to tackle advanced problems or work with the instructor to determine new directions of study. Prerequisites: 51331

Prerequisite: 51-331

51-333 Design Center: Collaboration by Design

Intermittent: 9 units

In Collaboration by Design, we'll be working on improving the ways we collaborate. Through this hybrid seminar/project-based studio, we'll explore ideas to improve collaboration in formal and informal contexts, along with intra-, inter-, multi-, and trans-disciplinary settings. We'll be exploring how issues such as personal values and goals, intimacy and independence, team dynamics, constructive criticism, and others affect the way we work together. Students can expect reading assignments, class discussion, informal (low stakes) writing projects and presentations, and team-based exercises and projects in which we share and apply our learning and develop ideas. Note: students taking this course will help set the topics and curricular trajectory for the course in collaboration with the instructor, so from day one we'll start the work of defining what we'll do, together.

51-336 The Non-Selfie

Intermittent: 9 units

The Non-Selfie: using the camera to record, probe, and understand one's own and another's behavior This course is the opposite of the selfie, but it uses the camera to record human behavior, both your own and another's. Designers need to be good human observers in order to design for human needs. Designers also need empathy. This course aims to deepen sensitivity to others by first better understanding ourselves. Informed by Manfred Max-Neef's classification of fundamental needs and other relevant materials, we will create two in-depth photo-essays, the first being a study of ourselves, the second being a study of someone who is unfamiliar to us. In the first half of this course, while looking at the tradition of self-portraiture in photography and other media, we will be making in-depth photographic stories of ourselves. In addition to photographs, we may make scans of objects, include personal artifacts and anything else that may contribute to building an in-depth self-portrait. In the second part of the semester, we will apply what we learned to a person who we do not know, in hopes of bringing new insights and methods to understanding for another. In addition, we will look at the rich literature that exists in documentary photography about representing "the other." By the end of the semester, each student's work will be made into a hand-made Japanese stab book of two volumes: a volume on oneself, and one on another. The skills learned in this course are immediately relevant to becoming a good designer. Digital camera is necessary, and knowledge of camera operation, Photoshop and InDesign is helpful.

51-338 Documentary Photography

Intermittent: 4.5 units

Documentary Photography: the Social and Built Landscape Documentary photography explores issues, often social, humanistic and/or political, in man-made culture. This course examines the work of nineteenth, twentieth, and twenty-first century documentarians while students photographically investigate their own topics. Among the many ethical areas of a documentarian's concern, the course examines (through looking at the documentary tradition and through the student's own work) the following: the photographer's relationship to the subject; the choices involved in representing the subject; the act of selectivity in framing the subject; the reasons for making documentary photographs; the intended audience for documentary photography; and the appropriate final display of the photographs? Extensive shooting, printing, and library research. Prerequisite: A beginning photography course, or by the permission of the instructor.

51-341 How Things are Made

Fall: 9 units

This course will provide a breadth of knowledge for manufacturing, materials, and processes encountered in the industrial design field. The class will consist of various lectures, media, electronic tools, and on-site visits to enable an understanding of how mass production affects design and design decisions. Industrial/Product Design Juniors and Seniors, or permission of the instructor.

51-343 Products Studio III: Designing for Complex Products Systems

Fall: 10 units

This course provides a framework for understanding core practices of the product design profession by placing it in relation to other disciplines and their influences on mass manufacture of goods; students will use a design process to identify problem/s, map a process in which tangible artifacts are made to learn more about the interaction between object, person, space, and context Prerequisites: 51-245 and 51-248

Prerequisites: 51-245 and 51-248

51-344 Advanced Digital Prototyping

Spring: 6 units

This course is an advanced course using SolidWorks computer modeling. It is a prerequisite for Production Prototyping. This course is intended for undergraduate Design majors.

Prerequisites: 51-249 or 51-245 or 51-324

51-346 Production Prototyping

Spring: 6 units

This course is the 2nd half of Advanced Digital Prototyping, using your work in SolidWorks to produce hard models. This course is for undergraduate Design majors.

Prerequisites: 51-249 or 51-324

51-347 Drawing from Nature

Intermittent: 9 units

Drawing From Nature This course is about observing and making images of things growing, crawling, flying, swimming etc. Observations will be made firsthand in the field, supported with relevant research in topic areas with the aim of deepening personal understanding of all things biological. Issue surrounding natural forms such as behavior, locomotion, adaptation, the environment and systems will also be investigated. We will work in tandem on refining our abilities in communicating what we discover through the process of drawing. A variety of visualization methods will be covered i.e. analytical drawing, visual notes, and diagramming to name a few. We will be using a variety of basic drawing and digital media to develop our work as we uncover aspects of form, structure and surface. Guest speakers will present work they have done in areas such as botany, biology, and environmental studies to name a few. A majority of the work will be done in the field and will then be developed in the studio. A final project will be assigned that will challenge you to develop a concept along with a compelling form(s) that communicates what you have uncovered about nature to a variety of audiences. This course builds on your experiences from First Year drawing and introduces several more advanced visualization methods. This course is intended for Junior and Senior Design Majors.

51-349 Visual Notation/Journaling

Intermittent: 9 units

Visual notation is the graphic equivalent of taking written notes. While the camera is a valuable and at times indispensable tool for recording what we see, the camera cannot make visible mental concepts. Nor can it discover and display underlying structures, create hierarchies, explain organizational schema or concepts that are not easily seen or understood. This course is about making visual notes in order to become fluent in your abilities to observe, record and interpret. Through daily entries in a journal you will work in several content areas i.e. mapping, natural and built environments and systems to name a few. A good portion of the work in this class will be conducted in the field using the resources available to us such as the museum, zoo and architectural sites. You will also be challenged to incorporate your notes as tools for communicating design concepts, implementing project development and presentations. The course will rely on the use of a variety of simple drawing tools and electronic media. Several visualization methods will be introduced and the work will build on the drawing experiences from First Year drawing. This course is intended for Junior and Senior Design Majors.

51-350 Products Studio IV: Designing Products for Social Systems

Spring: 10 units

This course challenges students to build their own design and research process to identify and frame the scale and scope of a problem/opportunity, and place it in relation to the wider system (social, cultural contexts); projects will require synthesizing a range of inputs to develop proposals for future working and living.

Prerequisite: 51-343

51-352 Product Design: Influences on and trends within: 1900 to Present

Intermittent: 4.5 units

A personal perspective on some of the prominent influences and trends in the field of product design since its inception as a recognized commercial discipline, some 100 years ago. The growth of mass-production, its development from craft-based making origins, the impact of technological developments, two world wars, the presence of visual media and advertising, and other cultural waves and trends all show themselves in the products we design, desire, produce and inspire us. Through a series of talks, readings, presentations and a few guest speakers, the class will take a less-than-formal approach to looking at how we got from where we were then to where we are now. There will be discussions, writings, and a visual, notated journal to track your thinking, express your reactions, and thoughts, and the beginnings of a visual archive to take with you after the course ends. An interest in product as a window into cultural thinking is recommended, but not required. Writing, sketching, and searching skills are recommended for participants. Assessment is based on participation, engagement, and the building of a personal archive. 15 students maximum. Preference given to P track undergraduates

51-355 Experimental Sketching

Intermittent: 4.5 units

Experimental Forms of Sketching fall 2011 Advancing design drawing philosophy and application This 7 week mini course seeks to expand our experiences with interpreting forms of drawing quality within the process of sketching. This approach will explore semantics of rendering with mixed media, sensitivity of representational perspective, form building, and sequence evolution, within drawing developments that stimulate emotional connections with a viewer. Through exploring and testing variables, we will use the nature of drawing behavior processes to expand the interpretive significance of abstract idea forms. These "drawing idea forms" will be represented throughout a range of abstract levels from literal to highly figurative. Interpretations will derive from a variety of themes involving design, life, and nature and expressed on paper as objects, scenes, and story persuasions.

51-357 Stuff That's Optional: People at Play

Intermittent: 9 units

Stuff that's optional: People at play Unlike our necessary work that provides sustenance for self and dependants, our recreation is optional and chosen. Products that support recreation are, likewise, an option. Soccer balls, kayaks, daypacks, fly reels, chess sets, running shoes; for that matter, the entire recreational industry is based on election. Our lives are better off for it; play is good for us. In this studio/ project course we will investigate play as an aspect of human endeavor. There are readings, discussions, and sessions aimed at gaining an understanding of the field. We will then respond by searching out and framing design opportunities, ideate and propose, refine and test. We will make stuff as teams and individuals that help us further define what it means to be humans at play. This course is intended for Junior and Senior Design Majors.

51-359 User Experience Research and Design

Intermittent: 9 units

This is a team studio project course that provides a template for identifying an innovative product, business, service, and/or system. This course will enable you to have a longitudinal learning experience to understand disparate information, identify opportunities, and develop tangible solutions for an undiscovered or underrealized needs through the human centric design process, team collaboration, and visualization tools. Effective user experience is about synthesizing four dynamic issues at the many levels. UX design requires human interaction considerations of: cognitive, physical, behavioral, and emotional aspects. This course will require application of behavioral research, analysis, and synthesis to design in 2D and 3D mediums, and present a product solution in visual format. By Instructor Approval if NOT in Design. Please forward statement of intent to Instructor.

51-360 Environments Studio IV: Designing Environments for Social Systems

Spring: 10 units

Develop high fidelity proposals and demonstrations of multi-modal hybridized physical-digital environments based on rich information content and principles of user experience design.

Prerequisite: 51-363

51-361 HyperSENSE: Augmenting Human Experience in Environments

Intermittent: 9 units

We make sense of the world using our bodies, and just as we shape the environments around us, they also shape our experiences and senses. We will look in this course at how we can create physical and digital interactions that bridge the gap between humans and built environments to augment our senses. We will explore and introduce new roles of computational design and making in embodied sense-making, including human perception and cognition. We will apply methods and practices that form the basis for embodied interaction design. We will create projects that materialize these interactions using research-through-design and iterative design methods. Students choose the themes for their final projects or join an ongoing research project. Students in this class will work in groups to create installations in space controlled by human actions or wearable pieces that augment the body. Course deliverables include participating in reading discussions, a main project, and a publishable paper documenting the theoretical approach, creative process and findings. The instructors will help students publish their papers or pictorial in upcoming design conferences if students ask for help. Some possible themes for these projects could be: An installation that materializes a human presence in a remote space; a remote collaboration work tool or a wearable piece that enhances a certain human sense, and/or alters the perception of a specific space.

Course Website: <https://embodiedcomputations.org/teaching> (<https://embodiedcomputations.org/teaching/>)

51-362 Environmental Typography: Experiments in Space, Place & Identity

Intermittent: 9 units

This course explores the creative opportunities for typography in the physical environment. Through both individual and team projects, we experiment with dimensionality, material, color, and form. Design experiences that consider scale, interaction, and experimental type. Learn theories, concepts, and strategies related to wayfinding. And lastly, give form to identities through color, material, form, and typographic systems.

51-363 Environments Studio III: Designing for Complex Environment Systems

Fall: 10 units

Building off your knowledge in space, scale, atmosphere, time, form and multi-sensory design, paired with your experience in the design of interactions, this studio challenges you to consider different types of existing systems and experiment with ways to think and design within them. You will further develop your conceptual and storytelling skills, grounding your ideas in research while embracing complexity and the role of design in shaping human experiences.

Prerequisites: 51-268 and 51-265

51-364 Drawing Spaces

Intermittent: 9 units

The natural and built environment will comprise the subjects of inquiry in this course. We will investigate systems of spatial and physical organization as found in the landscape in various forms and structures from forest to farm and from tent to tenement as examples. The intersection of these systems found in accessible locals will be investigated in the field through on site drawings using simple media and sketchbooks. These studies will then form the basis for the iteration of more developed images depicting environments both existing and imagined. Some time will be spent on observing people and various life forms as they populate and interact within these spaces to various ends.

51-365 Creative Technology Sprints

Intermittent: 9 units

In this course, we will take computational approaches to explore information design in space. Students will consider the interactivity and readability of information when creating data-driven systems. They will learn Javascript programming and use P5.js for their interactive systems. There will be three projects: 1) Speech-responsive Kiosk; 2) Immersive Space using Projection; and 3) Data Visualization using Holo Lens. There is no prerequisite for this course, but basic understanding of typography and information design is expected.

51-367 Design Center: Computational Design Thinking

Intermittent: 9 units

In this course, we will explore creative coding in the context of communication and interaction design and use it as a primary medium to consider form, content and context for designing systems. Specifically, we will use computation as process and material for perceiving and generating forms through crafting the relationships between input and output. In other words, we will create artifacts computationally by designing formations through constructing algorithms and manipulating parameters for recognizing, deconstructing and generalizing patterns across solutions. There will be three group projects to explore the following concepts: 1) Rhythms and Patterns, 2) Structures and Relationships, and 3) Conditionals and Events. There is no prerequisite for this course, but strong understanding of typography, grid, and visual system is expected. In addition, since coding is an integral part of this course, it is assumed that you already have prior experience with programming or will spend time outside of class to learn and understand the basics on your own (links to online tutorial videos will be provided).

51-368 Moving Pictures

Intermittent: 9 units

The objective of this course is to provide students with a practical, technical and theoretical foundation in video work. Students leaving this class will have gained knowledge of developing a moving picture from start to finish. Students will learn how to storyboard/scamp, plan/scout, produce, and post-produce. Equally importantly students will develop their own visual esthetics through the creation of 4 short videos.

51-369 You Are Here: Identity & Place

Intermittent: 9 units

Join us to explore how designers can express the identity of places, help people navigate complex environments, and craft memorable experiences. We will spend the semester experimenting with type, color, and pattern, while pushing beyond the boundaries of 2D surfaces to also consider materiality, dimensionality, and the environmental context. We'll also learn and apply theories of wayfinding, make custom typography and utilize it to design a variety of artifacts, and discover something new about the people and places around us.

51-371 Futures I

Fall: 4.5 units

The Futures 1 course focuses on aligning near term design action with longer time horizons aimed at sustainable futures. We introduce the students to Dexion Futures. Dexion is defined as "an experimental type of design that integrates Futures Thinking with Design Thinking." A distinguishing feature of dexion in our usage is the focus on aligning current action with long-term sustainability goals. The course covers different approaches to interpreting the future: from the extrapolations of trend forecasting, through the risk assessments of scenario planning, to attempts to steering the present through backcasting. Students explore the future through utopian and dystopian fictions that are created by authors, filmmakers and themselves. Students also attempt to evaluate futures in terms of their longer-term consequences.

51-372 Persuasion

Spring: 9 units

Examine written argumentation, oral presentations, artifact exhibitions, but also branding and social media. Students learn how to position their design ideas and connect them to the people and organizations that will increase their perceived value to target audiences. A focus of the course is on argument by precedent, where students build the significance of their innovations by situating them historically.

51-373 Futures II

Intermittent: 4.5 units

This course, paired with Futures I (51371), is the second half of a semester-long deep dive into foresight/futures for emerging designers. It represents a turn from learning basic concepts and methods in the futures field, toward more advanced, applied approaches at the cutting edge of strategy, co-design, worldbuilding, and transmedia storytelling.

51-374 Preparing for Design Practice

Intermittent: 4.5 units

Before entering the professional world, every design student must understand who they are as designers, what drives them, and how they want to contribute through their practice. What excites them about design? What kind of work feels meaningful? Where might their creative path lead? This course is designed to help students answer these questions with clarity and confidence. Throughout the semester, the focus will be on developing essential tools to represent themselves and their work—refining portfolios, resumes, reels, and personal identity packages. But beyond the tangible deliverables, this course is about building the ability to present work authentically, communicate ideas effectively, and shape a story that resonates with others. By the end of the course, students will leave with more than polished materials. They will leave with a strategic plan aligned with their ambitions and a clearer sense of direction. More importantly, they will gain confidence in who they are as designers and the impact they wish to make through their practice.

51-375 Meaning in Images

Intermittent: 4.5 units

Images abound in our culture. This course takes a critical look at many different kinds of photographic images to understand how they operate in our culture to inform, persuade, and entertain various audiences. The content for this course will be generated from looking at, thinking about and discussing issues discovered while studying well-known to lesser-known images that range from photographs used in ad campaigns, to photographs that are used in scientific representation, to snapshots in family photo albums, to photographs that are used to show social injustices, to photographs that exist in museum collections. Readings will be assigned and short writing exercises will be required throughout the semester. In addition, photography assignments will be given. Design majors will have preference. Requirement: a digital camera. 15 students, junior and senior Design Majors.

51-376 Semantics & Aesthetics

Intermittent: 4.5 units

The course will explore the principles of visual composition, proportioning systems and the rules of order as it relates to art, architecture and design. The class will involve extensive reading and discussion of these topics in class. Some project work will also be required but minimal to the reading. A reading list will be provided. Instructor permission required for non-Design majors.

51-377 Design Center: Sensing Environments

Intermittent: 9 units

Whereas UX Design is typically described as shaping the immediate environment between a user and an object/interface, this course will instruct you in techniques, methods, and vocabularies to expand the scale of your design. Course content will give students experience integrating and shaping their current work into 2-3 other levels of scale, such as a single room, building, campus, and neighborhood. Students will walk away with an understanding of environments that will expand their range of capability, fitting for interdisciplinary application within fields such as social innovation, community development, public policy, architecture, and urban design.

51-378 Developing Form with Sketches & Models

Intermittent: 4.5 units

Development of Form with Models and amp; Sketches

51-379 Spatial Computing Design

Intermittent: 9 units

In this class, we will use Motion Tracking and Spatialized Outputs to design spatial computing experiences—collective, distributed, and localized interactions in a physical environment. We will work in a classroom instrumented with infrared cameras, digital projectors, and Sound Hologram technology (Wave Field Synthesis). In Unity 3D and using a digital twin of this classroom, we will program the interactions (in C#) to be tested in the physical space. Although some of these technologies relate to AR and VR systems, we will create experiences in the physical world without the interference of screens, headphones, and/or headset devices. This project-based class focuses on advancing research through prototyping and testing working implementations. The class sessions are structured around tutorials, short lectures, working sessions, and reviews.

51-380 Experiential Media Design

Intermittent: 9 units

Experiential Media Design focuses on the theory, methodology and history behind the design, development and interpretation of experiential media systems. The class incorporates a multidisciplinary approach to the study of complex media systems as technological, political, economic, socio-cultural and personal experiences. Topics covered include media and communications theory, cultural studies, qualitative and quantitative methodology, design principles, human-computer-interaction, information visualization and representation, user studies and evaluation. Students will create and critique a variety of integrated media systems demonstrating technical competence, aesthetic knowledge, analytic rigor and theoretical relevance. This class is open to Junior and amp; Senior Design Majors, and others by permission of the instructor.

51-382 Design for Social Innovation

Spring: 9 units

Design for social innovation is a seminar that traces the history and application of design methods to solving social problems. The course will weave together themes from readings in design, business, public policy, technology, social service, international relations and current events. The course will review examples of successful and failed social innovations from local, regional, national and international contexts. Students will learn the role of governments, technology, funding, infrastructure, mindset, emotion, and cultural factors in addressing problems in the social sector. The course will include a real-world problem-solving component where students (in teams or individually) will write a paper, design an artifact or intervention, propose a project or conduct a short design research study that addresses a real-world problem that impacts a local community.

51-384 Design Center: Co-Designing for Social Innovation

Intermittent: 4.5 units

This course is for students considering how their work can contribute to a positive societal shift. Through a mix of lecture, readings, classroom activities and short field assignments, the course covers models of change, and methods, approaches, and skills that support the emergence of new social patterns. Such work necessarily involves diverse stakeholders, the complexity of human relationships and beliefs, and the challenges of power, conflict, exclusion and inequity. For that reason, this course helps students make first steps in preparing to facilitate creative change among diverse stakeholders attending to the conditions for generative dialogue, listening to all voices, and hosting the long process of co-creation.

51-385 Designing Service Experiences

Intermittent: 9 units

What does it take to get a service experience right? How can we integrate digital interactions and physical experiences? What is the role of design in the business of services? We will seek to answer these questions as we learn the fundamentals of service design in this project based course. This includes the tools and practices of the discipline, and using service design to both analyze and improve existing services, as well as develop new, compelling services. Our goals (and the objectives of this class) will be to understand service design by hypothesizing, experimenting, building, testing our assumptions, pivoting, tweaking, and improving. This course utilizes interdisciplinary and mixed-cohort teams to replicate the experience of working as a service designer, and ends with you pitching a new service that you believe has value to a particular audience.

51-387 Introduction to DeXign Futures

Intermittent: 9 units

As corporations, governmental organizations, and civil associations face accelerating change in uncertain times, increasingly they are looking to designers for new ways of thinking and acting. Designers today are engaged as thought leaders, strategists, activists, and agents of change in complex socio-technical problems throughout private, public, civil and philanthropic sectors worldwide. For designers trained to shape futures defined by uncertainty and change, these exponential times represent unprecedented creative opportunities for innovation. In this course, students learn the basic design skills necessary explore the forces that drive change in the future and learn to align innovation strategically with the trajectories of those forces.

51-389 Typeface Design : Variable

Intermittent: 9 units

There is a lot of expression in font files... The challenge is in getting the possibilities out. Relatively speaking, the tools used to craft, produce, and publish typographic forms have never been more plentiful nor more accessible. Computation has fused with form-making and generative processes creating limitless formal, practical, and conceptual potential. Kinetic and dynamic surfaces and screens abound alongside the continued stabilization of variable and color font formats. Unlike experimental font formats of the past, these emerging tools have seen ever-increasing community use, adoption, and advancement. We are in the midst of a (variable) typographic tidal wave. One which will have an unfathomable impact on *how* we communicate and *who* is able to communicate. This is a special topic studio elective on variable (and color!) fonts; from methodologies to visualize variable design spaces to the practical know-how needed to craft them. We will specifically explore variability in relation to the production of type, and curiously chart the number of ways in which the tools/programs of type production can be used (and mis-used) to animate forms (letters or otherwise) in endlessly generative ways. We will navigate the relationship between the history of code, and the history of font production, to find ourselves making within the current context of variable, and color, type technologies. Primarily a studio-centric 'off-road typography' making and prototyping environment, the course's critical dialogue will focus on the transformation of language and communication through these variable design processes.

51-390 Social Interaction Design in Community

Intermittent: 9 units

The course looks at Design for Social Innovation principles and practices, Documentary Photography, and Design Research while walking the streets, talking to residents, and working with organizations in a Pittsburgh neighborhood to understand its challenges. Students will examine Social Design case studies, with a focus on Problem Reframing processes (Dorst), and Solution Amplification (Manzini), and various design-enabled Theories of Change. They will also explore histories and theories of Documentary Photography. For the project/ethnographic portion of the class, students will work in teams of two within a neighborhood, and partner with residents and organizations. These collaborations will help students see the challenges of the community from an insiders point of view, in order for them to design appropriate responses to some of those challenges.

51-392 Images and Communication

Intermittent: 4.5 units

No one doubts the value of photography as a means of recording life. Even if we don't think of ourselves as photographers, digital cameras make it easy to photograph our families, our trips, and aspects of our life that we want to remember. But beyond snapshots, can photography also teach us how to see? And how do they teach us about the world? And, what are the qualities inherent in photographs that make them effective as artifacts of communication? Does looking through the camera's viewfinder sensitize us to world and help us see more? Or, as some writers suggest, does the camera interfere with experiencing the world fully. This course explores seeing with the camera and the many issues that arise when one snaps the shutter. We will be looking at a range of different kinds of photographic images, understanding their contexts, and how to read them. Designers and other visual people use photographs extensively in their work. This course endeavors to make students more aware of their decisions and actions when making photographs as well as how to judge a photograph's effectiveness. The issues that we discuss using photographs, relate to other kinds of visual images, as well. We will be making photographs as we are discussing critical issues in photography that come out of readings. Students must own a digital camera but no prior photographic experience is necessary.

51-393 Design Studies: Object-Based Histories at the Museum

Intermittent: 4.5 units

Object-Based Histories utilizes as its primary source Extraordinary Ordinary Things, the design collection installation of more than 300 works at Carnegie Museum of Art. In a small group setting students in this elective will consider historic and contemporary designs within the museum galleries. Through close looking and conversation, we will explore designers, makers, and users and their various cultural contexts. This course takes a its premise that if objects in the world are solutions, we can learn to intuit the questions. In so doing, we gain insights into human nature, cultures, and the built environment. Students will expand their knowledge of design histories, materials, and technologies and hone their skills in visual analysis, historical imagination, and critical thinking.

51-396 Design Center: Design for Zero Carbon Lifestyles

Intermittent: 4.5 units

In this mini-course, students focus on aspects of Sustainable Development Goals: #13 Climate Action, #12 Responsible Consumption and Production, #11 Sustainable Cities and Communities, #9 Industry, Innovation, and Infrastructure, and #7 Affordable and Clean Energy. Students explore how to become the agents of change around the challenges of the climate emergency focused on the design of zero-carbon lifestyles. Projects focus on zero-carbon lifestyles on two levels: individual and campus life. This course is open to all kinds of designers ranging from architecture, art, business, computer science, HCI, engineering, psychology and so forth.

51-399 Junior Independent Study

All Semesters

Guidelines for independent study in the Design office. Proposals must be approved by faculty before registration.

51-400 Transition Design

All Semesters: 9 units

Transition Design: Designing for Systems-Level Change. This course will provide an overview of the emerging field of Transition Design, which proposes societal transitions toward more sustainable futures. The idea of intentional (designed) societal transitions has become a global meme and involves an understanding of the complex dynamics of socio-technical-ecological systems which form the context for many of today's wicked problems (climate change, loss of biodiversity, pollution, growing gap between rich/poor, etc.). Through a mix of lecture, readings, classroom activities and projects, students will be introduced to the emerging Transition Design process which focuses on framing problems in large, spatio-temporal contexts, resolving conflict among stakeholder groups and facilitating the co-creation, and transition towards, desirable, long-term futures. This course will prepare students for work in transdisciplinary teams to address large, societal problems that require a deep understanding of the anatomy and dynamics of complex systems.

Course Website: <https://transitiondesignseminarcmu.net/>**51-418 Diversity, Equity, Inclusion and Design**

Intermittent: 9 units

In this course, students will explore Diversity, Equity, and Inclusion (DEI) issues as they relate to the School of Design to propose and possibly implement and initiate efforts to begin to address some of these issues. We will learn about the systems, structures, and tools for, by, and with Design at the intersection of DEI. Foundational lectures, discussions, and hands-on workshops combined with a review and consolidation of precedent research and work supporting the definition and scope of DEI. Through a variety of group exercises, directed working sessions, guest lectures by subject matter experts, readings, case studies, and more, students will be guided through an intensive learning process. Students will work individually and collaboratively, including working with the full course cohort. We will ask questions such as: What do we mean by DEI? What are the opportunities and challenges within the design discipline and its pipelines? Within design pedagogy and practice? With designers and designing? What happens if we put DEI at the center of our work? How do we develop new postures and mindsets that place DEI at the forefront of the School of Design at Carnegie Mellon University?

51-419 Design Center: Design's Reverberations: Ripple Effects of Innovative Ideas

Intermittent: 4.5 units

When an idea is implemented to effect change, what happens to its context? This course provides students from different backgrounds with the opportunity to think through multiple dimensions of and orientations to the notion of solving a problem through making and theorizing. Through the lens of design-driven processes, the class will delve deeper into the conditions in which problems are solved and place focused attention on domino and ripple effects of effecting change. Students will uncover what may be brewing underneath the surface of a given context, such as the residual impact of historic events, changes to the topographical landscape of a neighborhood, connections between individual behavior change to the growth of niche cultures, sensorial shifts in the environment due to climate change, emerging instabilities in a system sparked by the implementation of an idea, amongst others. Students will use present-day contexts, such as neighborhoods or particular initiatives, as points of departure to answer the questions when an idea is implemented to effect change, what happens to its context? Students in this course will gain a deeper understanding of the complexities of instigating change to inform their ethos and practice.

51-420 Sensing Place through Color

Intermittent: 9 units

The world is enhanced by color in every facet of our environment, but we often overlook unimaginable color interactions. The application of color depends mainly upon a trial and error process of selection, comparison, interaction, and evaluation. This course is about learning to look at the world with color filters and exploring ways to utilize color in new and meaningful ways. Through a series of prompts, journaling exercises, and personal experiences, we will reimagine our sense of place through color.

51-421 Design Center: Data Visualization

Intermittent: 9 units

This is a comprehensive data visualization primer. In Data Visualization course students will learn how to parse and visualize data. Starting with multiple introductory exercises on the foundations of data viz, we will then investigate tools, principles and best practice by which computational design driven data visualizations are operating today. Then, students will decide on a data set of their choice (necessary complexity given), to either create a data visualization with an emphasis on telling a story, or to generate a meaningful data art piece with an emphasis on engagement and experience. Project outcomes can be expressed through a variety of forms of the students choosing, from print posters, websites to mind-bending interactive experiences. These will be documented and presented on the final crit. This course assumes that students are already familiar with elementary programming (in any language), such as for() loops, if() statements, arrays[] and functions(). Participants will use Javascript and very likely popular creative coding toolkits like p5.js, Basil.js, Snap.svg, GSAP, D3.js etc. for their projects.

Course Website: <http://bit.ly/CMUDataViz> (<http://bit.ly/CMUDataViz/>)

51-423 Pieces 2.0: Social Innovation: Desis Lab

Intermittent: 9 units

In this class, students will identify a social problem and take a holistic design approach to solving it. They will design a product/product line—anything from a set of tools to help older adults lead a more active lifestyle, to re-envisioned collateral for the Lupus Foundation Pennsylvania. After or in tandem with the creation of this product, the student will construct an image, which will entail print media, a Web presence, packaging, and photography. By creating the product and its "marketing" effort from top-to-bottom, the student will gain a diverse set of skills in design as well as a richer understanding of the product. In the end, all the pieces will come together to create a well-refined image.

51-424 Web Portfolio

Intermittent: 4.5 units

This course will provide an opportunity for students to design and code their online portfolio. The course covers basic elements of Web design along with the foundations of HTML, CSS, Javascript and Flash as components of the design process. Prior experience with HTML is encouraged but tutorials will be provided if necessary. This is not an Actionscript programming course.

51-425 Design Center: Beginning Book Arts Lab

Fall and Spring: 6 units

This is a class of basic issues regarding hand bookbinding and letterpress printing. It's purpose is to develop a basic structural sense of book forms, of flat format work and of three dimensional forms. Learning hand craft techniques, developing hand skills and the sensitivity to materials are also a goal. Binding projects assigned will target the unique nature of papers, fabrics and archival card-boards. Structural procedures and techniques will be identified with each assigned binding project. The binding projects will be: A hardcover for a paper back book, a single signature book, a multi-signature book with flat spine, and a box construction. The box project is designed and crafted to contain a small letterpress printed class edition, either in book form, or as a set of un-bound pages. The letterpress component teaches the standard issues, unique to the relief process, in press work, handset procedure of cast metal type, page form spacing, lock-up of pages in press, proofing, and production printing. Each semester a small class edition project of text content and image, in two-color registration, is designed, hand set and printed. Image generation can be by hand cut block, assembled type-high forms, or digital process to polymer plate. This class is not to be repeated.

51-426 Design Center: Beginning Book Arts Lab

Spring: 6 units

Beginning Book Arts Lab Class. 6units. (This class is a prerequisite for the Advanced Book Arts Workshop Lab Class). This is a class of basic issues regarding hand bookbinding and letterpress printing. It's purpose is to develop a basic structural sense of book forms, of flat format work and of three dimensional forms. Learning hand craft techniques, developing hand skills and the sensitivity to materials are also a goal. Binding projects assigned will target the unique nature of papers, fabrics and archival card-boards. Structural procedures and techniques will be identified with each assigned binding project. The binding projects will be: A hardcover for a paper back book, a single signature book, a multi-signature book with flat spine, and a box construction. The box project is designed and crafted to contain a small letterpress printed class edition, either in book form, or as a set of un-bound pages. The letterpress component teaches the standard issues, unique to the relief process, in press work, handset procedure of cast metal type, page form spacing, lock-up of pages in press, proofing, and production printing. Each semester a small class edition project of text content and image, in two-color registration, is designed, hand set and printed. Image generation can be by hand cut block, assembled type-high forms, or digital process to polymer plate. This class is not to be repeated.

51-427 Advanced Book Arts Workshop

Intermittent: 9 units

Students will be required to plan and design projects that relate to binding, or digital printing, or letterpress printing, or hand-setting of cast metal type. Projects utilizing a combination of all processes can be planned as well. Experimental work, or Artists' Books are also encouraged. In this class structure students will be able to plan and design projects that are complete books, with printed content, or with out content. Other flat structures, and three dimensional containers are examples of general forms that will be categorized as binding work. Students who wish to enroll in this course must have already taken Beginning Book Arts, and must also speak to the instructor directly about project ideas. Emphasis for binding is working independently with a greater level of hand craft and a sensitivity to materials. Emphasis for letterpress printing is to learn in depth, and master, the general mechanical process for doing press work. Emphasis for hand typesetting is on gaining an understanding of the system of cast metal type, and to develop a sensitivity to typographic principles. Instruction will be given on an individual basis through consultation at strategic times throughout the semester. Project evaluation will be based on the success of the project work compared to each student's written project proposal at the start of the semester. The Advanced Workshop in Book Arts can be repeated. For more complex project work this class can be continued for the following semester.

51-428 Time, Motion and Communication

Intermittent: 9 units

This course focuses on designing and presenting time-based messages on screen. The differences between paper-based and screen-based communication are discussed and become departure points for projects. Working with word, image, sound, and motion and #8212; in Adobe AfterEffects and #8212; students develop responses to a variety of project briefs. Brief histories of animation, experimental films, and title sequences, as well as experimental music provide conceptual models to our discussions. An attitude of exploration is stressed, with an emphasis on visual voice, performance, and communication. Content will include personal messages and timely information. Proficiency with AfterEffects is a firm requirement. Preference will be given to junior and senior Design students.

51-430 RE.Futuring Craft

Intermittent: 9 units

This project guides students to explore how historical artifacts can serve as tools for emotional reflection and cultural reconstruction. Drawing inspiration from the speculative and critical design practices of Dunne and Raby, the course invites students to revisit and reinterpret the past by engaging with objects that bear traces of forgotten functions, lost identities, and overlooked craftsmanship. Rather than approaching design through the conventional lens of user-centered utility and functional optimization, students are encouraged to shift their focus to the object itself—its material presence, imagined voice, and emotional residue. This object-centered perspective fosters a more imaginative and critical approach, where design becomes a means of speculation and storytelling. By attuning themselves to the quiet narratives embedded within these artifacts, students reimagine their meanings, forms, and functions, placing them in conversation with contemporary cultural contexts. In doing so, they move beyond surface usability to forge empathetic connections grounded in the object's history, ambiguity, and cultural resonance. These reflections ultimately lead to the redesign and physical making of the objects, allowing students to translate speculative interpretations into crafted forms that carry renewed cultural and emotional significance. This course is for CMU Juniors and Senior in the School of Design. Students external to Design must have approved access to a three-dimensional prototyping lab and equipment within their home department.

51-434 Experimental Form

Intermittent: 9 units

The Experimental Form Studio looks broadly at the discipline of industrial design with an emphasis on creating new paradigms for interactive objects. This course encourages an exploratory study of physical objects and artifacts and provides a creative and intellectual forum to re-imagine our relationship with objects. Each independently-themed project presents opportunities to consider embedded mechanics and technology, objects as interactive media, and experience-driven design. Experimental Form, at its most basic, is a process that blends play and inquiry in an open-ended way finding the unexpected through tinkering and trying something you don't quite know how to do, guided by imagination, curiosity, and a disciplinary skillset. In this sense, Experimental Form complements the core Product Design Studio sequence by providing a playground for intellectual discourse, experimental trial and error, and refining individual processes for designing. Prerequisites: 51-343 or 51-248 or 51-311

51-436 Designing w/CARE:Co-Creating Solutions for Complex Care Coordination in Oncology

Spring: 9 units

What does providing healthcare to patients with complex care coordination needs mean? How do we build processes and systems to ensure patients and family members receive the care they need and want? How can design thinking help healthcare institutions improve population health, reduce costs, enhance the care experience, and advance health equity? As a class, our primary aim is to explore how 'small wins' can lay the groundwork for a comprehensive approach to care. Students will work with University and Health System leaders to explore current and future clinical needs and propose solutions to improve cancer care delivery. It is a tremendous opportunity to gain first-hand experience through interactions with diverse students, healthcare providers, patients, and their caregivers. This course explores these questions within an academic-clinical partnership with the Division of Gynecologic Oncology at UPMC Magee Women's Hospital. Throughout the semester, rotating class meetings between the Carnegie Mellon School of Design and Duquesne University with exposure to experts in the field of design, healthcare, nursing, and population health. Each institution will run this course simultaneously, with opportunities for cross-pollination and transdisciplinary learning. In the second half of the semester, students will apply the knowledge they have gained from their varied disciplines and the knowledge they have gained from the first half of the semester to work on a team-based project.

51-437 The Emerging Ecological Worldview

Intermittent: 9 units

In this seminar it will be argued that the mechanistic worldview which has permeated Western (and Westernized) thinking and society since the scientific revolution has been crumbling for several decades: its place is gradually being taken by an emerging ecological (or holistic) worldview. This worldview coheres themes such as relationality, interdependence, self-organization, diversity, pluralism, creativity, context, process and wholeness. These themes have in many ways been embodied in the evolution of natural systems organisms, ecosystems and the earth itself and have enormous implications for how we inhabit the places in which we live and the planet as a whole, if we and the 'More-Than-Human World' are to flourish. We will ask what it means to 'think ecologically' and what are the implications of the ecological worldview for how systems of all kinds (technological, infrastructural, political, social, economic) are designed. Students will explore how the application of ecological principles can help us to more authentically 'inhabit' and satisfy our needs in the places in which we live, and inform strategies for designing for futures that are more sustainable, equitable and desirable

Course Website: <https://docs.google.com/document/d/1LJ7yptD8-MWkSaI9SZZdRKsQmscedSHsSH3TLbSVjs/edit?usp=sharing> (<https://docs.google.com/document/d/1LJ7yptD8-MWkSaI9SZZdRKsQmscedSHsSH3TLbSVjs/edit/?usp=sharing>)

51-438 Letterpress/Screen-printing DIY Workshop

Spring: 9 units

This hands-on class concerns creativity in two of the most essential print mediums. The Print Workshop is an opportunity to form a foundation of letterpress and screen printing arts. Within the studio space, you will have the chance to use equipment used within the art community today and some rare tools that only students of this class will have access to. You will learn the history and skills to safely navigate the 2/D Lab and the confidence and knowledge to make zines, posters, t-shirts, greeting cards, and more. Please note there is a course materials fee of \$75.

51-441 Foundation of BME Design

Fall: 6 units

This course focuses on the Product Development scope and framing of a new medical device. Students will work together in an interdisciplinary team with Biomedical Engineering students to identify medical professional or patient needs through behavioral research and participatory research methods. This course deliverable requires the team to propose the problem space and develop a design brief and plan for the following Spring semester to implement. Prerequisite: Junior level design or higher with studio training. Solid modeling or surface modeling recommended.

51-442 BME Design Project

Spring: 9 units

This course is the second in sequence of prototyping and testing a proposed medical device product. The course consists of modules for the development of a project plan, background research, hazard analysis, setting product specifications based on user requirements, detailed design and analysis, prototype development and final documentation and presentation. All products developed will respond to the needs of appropriate market segments; resulting products will be deemed safe, effective, useful, usable and desirable by those segments. Students will produce a form model, functional prototype, marketing plan, and manufacturing plan of their product. Prerequisite: 51-441 (3 units, Fall) Foundations of Biomedical Engineering Design (or permission of the instructor). Junior level design or higher with studio training. Solid modeling or surface modeling recommended.

51-446 Design For Aging

Intermittent: 5 units

The population is aging at a staggering rate. Though not the only factor, the last of the baby boomers (b. 1946-1964) are turning 60 this year (the oldest boomer turning 78). Similar aging statistics apply in the US and internationally. Implications for design are evident. Ignoring this segment of the population in the design decisions we make would not only be socially and physically detrimental; it would also overlook an enormous opportunity. In this course we will examine the broad scope of aging with an inclusive intent already established through the premise of universal design. This means challenging assumptions and stereotypes, recognizing the enormous diversity in how people age. Through readings, other media, guests, and direct hands-on experiences, we will understand and gain an appreciation for the range of changes that occur with aging, including physical and cognitive abilities, social and emotional wellbeing. While we will learn from other disciplines, the focus will be on implications for the design of products, communications, environments, and conditions for interactions in and with the world. The course is open to undergraduates in sophomore year or above, and graduate (masters/PhD) students. Priority registration is given first to design majors in the School of Design; others will be assessed from the wait list. Maximum enrollment is 12, with possibility of expanding depending on initial enrollment and wait list. Students with current or anticipated age-related projects (e.g., studio, thesis) are particularly encouraged to enroll.

51-451 Fundamentals of Joinery & Furniture Design

Fall: 9 units

Intensive introduction to traditional joinery techniques and the properties of wood through the use of textbook studies and lab experiments. Emphasis placed on how these techniques and properties influence design decisions. Students will learn how to set up, sharpen and use traditional hand powered tools. This acquired knowledge will be applied in the design and realization of a piece of wooden furniture. Limited enrollment. Lab fee and material purchases required.
Prerequisite: 51-350

51-452 Furniture Design II

Spring: 9 units

A continuation of 51-451, this course explores a much broader range of issues related to furniture design. Students will identify and define in a proposal the area of furniture design they intend to investigate and then produce one or more furniture pieces developed from their findings. Materials and processes applied to the project are limited only by the resources the student can bring to bear. Assigned readings and a series of in-class discussions will focus on the influence of workmanship in design, and on how the behavior of the user is influenced by the form or esthetic language of the artifact. Lab fee and amp; material purchases required.
Prerequisite: 51-451

51-455 DeXign The Future: Human Centered Innovation for Exponential Times

Intermittent: 9 units

DEXIGN THE FUTURE: Human Centered Innovation for Exponential Times
As corporations, governmental organizations, and civil associations face accelerating change in uncertain times, increasingly they are looking to designers for new ways of thinking and acting. Designers today are engaged as thought leaders, strategists, activists, and agents of change in complex socio-technical problems throughout private, public, civil and philanthropic sectors worldwide. For designers trained to shape futures defined by uncertainty and change, these exponential times represent unprecedented creative opportunities for innovation. In this course, students explore methods and tools for design in exponential times to shape uncertain futures. Students will explore the forces that drive change in the future (i.e., social, economic, political, environmental, technological), and learn to align innovation strategically with the trajectories of those forces. The design project that drives everything else is the future of mega-metropolitan regions, the hubs of innovation where 70% of people in the world and 75% of Americans will live in 2050. In the semester long project, students create scenarios for Life 2050 in Metro 3.0, using Pittsburgh as a locus and focusing on a project within urban systems such as Sustainable Production and amp; Consumption, Lifelong Learning, Human Development and Resilient Community.

51-471 Design Center: Imaginaries Lab: Research through Design

Fall: 9 units

The Imaginaries Lab is a research studio developing design methods to explore and support people's imagining both new ways to understand, and new ways to live, in an increasingly complex world. This course, running over three weekends, immerses you in a creative 'research through design' project, including prototyping and using experimental design methods 'in the wild', and in depth. You will learn and develop a variety of tools for conducting innovative forms of research through design, including exploring how people think, understand and imagine complex social and technological concepts, and envision futures, and depending on your expertise or interest, will be able to concentrate on applying particular skills as part of multidisciplinary teams. For example, a project might include speculative design, ethnographic inquiry, physical computing, and novel creative methods. We will aim to turn your work into a published output for a conference or journal, so there is additionally the opportunity to gain experience in this aspect of academic research.

Course Website: <http://imaginari.es>

51-478 Speculative Critical Design

Intermittent: 9 units

This praxis-based course will actively engage futures research through the integration of findings from critical readings, ethnographic research, mediated storytelling and hybrid prototyping. Using techniques of inversion, defamiliarization, uncertainty scenarios, everyday practice and good old-fashioned humor, we will create objects, systems and experiences that stimulate conversation, debate and understanding. The course seeks to produce a diversity of 'what will?' and 'what if?' cultural provocations that deeply examine possible, unwanted and seductive futures. This course is open to Junior and Senior Design majors, or by permission of the instructor.

51-480 Design Capstone Project

Spring: 12 units

Learn how to work independently, applying skills/knowledge in Products, Communications, Environments to the research/definition/development/testing of a project that focuses on the design of a service or social innovation that warrants investigation; deepen understanding of service and amp; social innovation design principles and how they are put into practice.
Prerequisite: 51-481

51-481 Senior Design Studio

Fall: 12 units

As contributors to the built world, the School of Design recognizes that designers can significantly impact society and embrace the responsibility to propose new ways of seeing and exploring the numerous dimensions of any given problem space. This studio is the next stage of that preparation. Structured into three separate discipline sections communications, products, and environments each will continue to leverage and evolve its disciplinary practices, ways of working, and purview to develop positive and impactful design proposals.
Prerequisites: 51-350 or 51-360 or 51-330

51-483 Debating the Roles & Responsibilities of the Designer

Intermittent: 9 units

Designers are expected to play a role in creating aspirational lifestyles through products and services, and informing and influencing human behavior on small and large scales. However what impact does or should the designer have on our lives, our society, and culture? Through readings, discussions, and team activity, students will construct pro and con arguments and debate the role and responsibility of the designer in a critical and fun way.

51-485 Design Center: Imaginaries Lab: New Ways to Think

Intermittent: 4.5 units

In this course, we'll carry out 'research through design' projects using experimental investigative methods in the wild, focusing on new ways to think and understand in an increasingly complex world. Learn and develop a variety of tools for conducting innovative forms of research through design, focused on exploring how people think, understand and imagine complex social and technological concepts, and envision futures. By the end of the course students will have worked on an interdisciplinary research project, including with an external partner, drawing on a number of disciplinary domains, and have experience with different kinds of design research and practice, from speculative and critical design to participatory design, as well as developing the skills and experience necessary to innovate with, and deploy, those methods. This course is a complement to 51-487 Design Center: Imaginaries Lab: New Ways To Live, but is independent of it, and either or both courses can be taken without overlap (we will be doing different projects, with a different focus).

Course Website: <http://imaginari.es/newways> (<http://imaginari.es/newways/>)**51-486 Designing Experiences for Learning**

Intermittent: 9 units

This course focuses on designing experiences that engage people in educational activities that enhance their learning through meaningful, memorable, and enjoyable interactions with information. Throughout the course, students investigate the intersection of design thinking, UI/UX design, cognitive studies, social sciences, instructional design, and educational pedagogy as a way of developing knowledge and skills in designing experiences for learners. Students study topics that are often difficult to grasp and collaboratively build a taxonomy of content types based on common and differentiating characteristics to identify design opportunities. Through readings, projects, and class exercises, students explore how people perceive and process information, what motivates them to learn, and what constitutes an experience. The course introduces students to traditional and emergent learning tools and methods as a means of defining affordances and limitations of various learning approaches and mediums. It also provides students the opportunity to apply what they learn through the design, testing, and assessment of learning experiences that they create.

51-487 Design Center: Imaginaries Lab: New Ways to Live

Intermittent: 4.5 units

Focusing on new ways to live and experience the world, now and in the future, we'll do practical investigative 'research through design' projects using experimental methods in the wild. Learn and develop a variety of tools for conducting innovative forms of research through design, focused on exploring how people think, understand and imagine complex social and technological concepts, and envision futures. By the end of the course students will have worked on an interdisciplinary research project, including with an external partner, drawing on a number of disciplinary domains, and have experience with different kinds of design research and practice, from speculative and critical design to participatory design, as well as developing the skills and experience necessary to innovate with, and deploy, those methods. This course is a complement to 51-485 Design Center: Imaginaries Lab: New Ways To Think, but is independent of it, and either or both courses can be taken without overlap (we will be doing different projects, with a different focus).

Course Website: <http://imaginari.es/newways> (<http://imaginari.es/newways/>)**51-489 Design Center: Designing Narratives Across Media**

Intermittent: 4.5 units

This studio mini will deal with designing at the intersection of three things: developing rich worlds, i.e. experiences and narratives, understanding how different mediums work and what they do, and understanding how genres work in terms of conventions around content and form. Students will thus be exposed to thought from various disciplines like media, genre, literary and cultural theory in order to create rich, interactive worlds as part of a single design studio project. Specifically, we will be analyzing and reflecting on the phenomenon of interactivity by studying how mediums like interactive print, film and cinema, tangible board/tabletop games, and installation art can be employed using the frame of "Other" futurisms (sinofuturism, afrofuturism, indofuturism etc.) that are part of the general practice of speculative and science fiction throughout the world. We will engage with popular and fringe cultural texts and artifacts, so students should be prepared to spend time watching movies, playing games, reading books etc. in an analytic, reflexive manner in order to better understand the different strategies that authors have developed in order to evoke specific responses in their audiences. In this class, you will bring the technical skills required - the object will be to collaborate with others with complementary skill-sets in order to create one lavish, intricate transmedial project that will draw people into the depth of its world. This is not an art class - we will discuss the designerly applications of this type of work, particularly with reference to design studies, speculative/critical design, ontological design, and decolonial design. The object of the course will be to make "other" ways of designing in the world visible and experiment with the boundaries of design as a practice of cultural production.

51-493 Design Center: Decoloniality: Past, Present & Future

All Semesters: 4.5 units

The relevance of decoloniality in design. The role of media and technology in shaping and advancing particular ways of understanding the world The future of decoloniality: where do we go from here?

51-494 Design that Lasts

Intermittent: 6 units

Never have we wanted, owned, and wasted so much "stuff." Our consumptive path through modern life leaves a wake of social and ecological destruction. Sneakers worn only once, forgotten smartphones languishing in drawers, and abandoned IoT devices promising solutions to problems that don't exist. By what perverse alchemy do our newest, coolest things so readily transform into meaningless junk? This design elective investigates why we throw away things that still work, and shows how we can design products and services that last. This is a studio class, with a substantial theoretical thread woven through it. We will therefore spend about half our time on lectures, readings, and debates, and the other half on studio practice, project coaching tutorials, and group critique. The result, a journey toward an experience heavy, material light design sensibility. A vital and timely new design philosophy that reveals how meaning emerges from designed encounters between people and things, explores ways to increase the quality and longevity of our relationships with objects, and the systems behind them, and ultimately, demonstrates why design can and must lead the transition to a sustainable future.

51-495 History and Future of Interaction Design

Intermittent: 9 units

The history of Interaction Design is far richer than what is commonly known among students and teachers, practicing designers and entrepreneurs. Understanding IxD's origins and evolution helps us realize the promises and possibly avoid some of the pitfalls of IxD's future. This course blends readings, lectures, discussions, and prototyping as a means for students to experience this history as if first-hand. Students become immersed in pragmatic yet mind-expanding examples of person-machine interactions and #8212; such as MEMEX, Musicolour, Hypertext, Dynabook, Fun Palace, Colloquy of Mobiles, Architecture Machine, THOUGHTSTICKER, Architrainer, and Hypercard. Through period articles and subsequent perspectives, students research a handful of historical innovations and then prototype key concepts from that history, forefronting what has been lost in modern commercial implementations. This offers students a hands-on experience of the history of IxD. To explore IxDs future, students are invited to invent it and #8212; to prototype their individual future vision of interactive experiences. The course is especially suitable for students with interest or background in interaction design, computational design, responsive architecture, and interactive media.

51-496 Systems, Cybernetics, Conversation

Intermittent: 9 units

Across many design disciplines—architecture and computational design, media and interaction design, design of services and organizations—methods for grappling with complex adaptive systems is now table stakes. Furthermore, design today demands profound, authentic attention to equity, human and non-human living systems, climate and environment, sustainability and ethics. Overall, designers must have skills to collaborate in cross-disciplinary teams. An encompassing framework for these disparate disciplines and domains of 21st-century design is the transdisciplinarity (or "antidisciplinarity") of Cybernetics. Cybernetics can be understood as the study of "systems with purpose", whether machines or living things, including their unpredictable interactions. Central to Cybernetics is conversation as a mechanism of design, inclusivity, participation, innovation, and the impetus to action. The course offers systems frameworks and models of conversation that are also relevant to Designing for the Internet of Things (48-675), Inquiry into Computation Design (48-727), and Design Studies: Systems (51-277). Class time balances readings, discussion panels, and guest conversations with executing assignments that involve systems modeling; creating conditions for designing that are participatory and inclusive; and prototyping in a range of media (installations, screen-based interactivity, physical prototypes, workshops, etc.) that offer responses to global wicked challenges.

51-498 Design Center: What If?

Intermittent: 6 units

WHAT IF? is a media, arts, and design-led exploration of speculation, conjecture, and storytelling. Using play and worldbuilding, we will investigate science fictional constructs, conjure alternative pasts and presents, voyage to the edge of the imaginable, and blur the borders between possible and impossible. How do you build a time machine, anyway?

51-499 Senior Independent Study

All Semesters

Proposal forms are available on the Design Intranet. Proposals must be approved by faculty before pre-registration.

51-504 Design Fusion: Patterns in Nature

Intermittent: 5 units

Natural patterns have fascinated humans for thousands of years. Explore the diversity of insect visual design, from super-sneaky camouflage to the loudest warning signals; learn why patterns occur in nature and how form and function intersect in insects. Use hands-on, up-close examination of museum specimens to study and illustrate your own original bio-inspired artwork. This course is offered through the Joseph Ballay Center for Design Fusion. This course is open to those with basic drawing proficiency and Photoshop skills.

51-505 Design Fusion: Bugs and Bioinspiration

Intermittent: 5 units

How do insects build complex and efficient mechanical structures that rival human technology? What is the basic insect toolkit, and how have beetles adapted it to create glowing light, fire detectors, explosive weaponry, and color-changing armor? Explore these questions and examine the world's most remarkable bugs up close, with specimens from the Carnegie Museum of Natural History. This course is offered through the Joseph Ballay Center for Design Fusion. This course is open to those with basic drawing proficiency and Photoshop skills.

51-506 Design Fusion: Creative Concepting

Intermittent: 5 units

Explore what distinguishes good ideas from great ideas and develop skills for ideating, developing, and visualizing a compelling concept that resonates with clients - in an agency-like environment. This course is offered through the Joseph Ballay Center for Design Fusion. Students must have visual drawing and image-making skills with access to Adobe Creative Cloud (Photoshop, Acrobat, Illustrator, etc), Powerpoint or similar presentation-making software.

51-507 Design Fusion: Designing for Presence

Intermittent: 5 units

The discipline of design is motivated by a drive to make things better. It can be very difficult, however, to maintain a genuine engagement required to address the biggest challenges we face, when our personal, social, civic, economic and environmental anxieties take so much of our energy. How can we sustainably apply our creative problem solving when we regularly feel overwhelmed? Designing for Presence helps us nurture ourselves and our connections as part of our practice of improving the world. Through a combination of readings, seminar discussion, mindfulness practices and a collaborative project, we will simultaneously fortify ourselves, cultivate empathy toward others, and explore practical design interventions to a real issue affecting the local community.

51-508 Design Fusion: Designing Data

Intermittent: 5 units

Our modern lives are flooded with data. This course provides an introduction to designing with data for non data-scientists and uses a project-based approach to explore types, formats, sources, and the visual presentation of different types of data. Students will work with a variety of qualitative, quantitative and experimental data sources. While there are no prerequisites for the course, students should have a working knowledge of some form of software that can be used to analyze and visualize data, including (but not limited to), Excel, Adobe Creative Cloud (Illustrator, Photoshop, etc), Google sheets, Apple Numbers, Sketch, Miro, Figma, etc.

51-509 Design Fusion: Drawing Linguistics

Intermittent: 5 units

Whether you are drafting a business plan, building a home, designing an app, or commissioning a piece of art, the intent and clarity of an idea is reliant on the fidelity and form of how it is communicated. Written forms of communication can be misinterpreted; existing reference imagery can be too limiting; but drawing offers an opportunity to specify exact detail and reflect the creator's imagination to the nth degree- all that is needed are the skills to capture those details. This course will explore the ways we can synthesize, distill, and communicate the essence of an idea through drawing. Prior drawing experience is not required.

51-605 Lab for Cybernetics: Engaging Wicked Challenges

Intermittent: 12 units

Cross Listed with Architecture 48-551 and 48-751 The Laboratory for Cybernetics supports students engaging with wicked challenges grounded in a thesis topic or personal project, by offering concepts and materials, models and methods, networks and collaboration. Cybernetics uniquely approaches systems in terms of purpose—the purpose attributed to the system and the purpose of those who articulate the system's purpose (see <https://tinyurl.com/L4C-Award>). Thus, Cybernetics demands explanations for system behaviors as well as responsibility for our own behaviors and the interventions we design. The course project is a design brief that is entered into a competition for a \$5K toward for implementation. The primary award criterion is to increase the total number of choices. The brief must articulate how the design increases the potential for human agency beyond existing approaches while affording an experience that is deeply resonant with the values and intentions of the persons engaged with it. See tinyurl.com/Lab4C-Spring25 for more details.

51-630 RE.Futuring Craft

Intermittent: 9 units

This course explores the role of craft objects in shaping material culture and material futures aiming to offer propositional and speculative concepts to future-cast craft objects within natural, societal political, economic, scientific, and technological systems. Students engage in project-based learning that simulates diverse future scenarios to critically analyze material trends and their impact on future hand-crafted product design.

51-646 Design for Aging

Intermittent: 5 units

The population is aging at a staggering rate. Though not the only factor, the last of the baby boomers (b. 1946-1964) are turning 60 this year (the oldest boomer turning 78). Similar aging statistics apply in the US and internationally. Implications for design are evident. Ignoring this segment of the population in the design decisions we make would not only be socially and physically detrimental; it would also overlook an enormous opportunity. In this course we will examine the broad scope of aging with an inclusive intent already established through the premise of universal design. This means challenging assumptions and stereotypes, recognizing the enormous diversity in how people age. Through readings, other media, guests, and direct hands-on experiences, we will understand and gain an appreciation for the range of changes that occur with aging, including physical and cognitive abilities, social and emotional wellbeing. While we will learn from other disciplines, the focus will be on implications for the design of products, communications, environments, and conditions for interactions in and with the world.

51-818 Diversity, Equity, Inclusion and Design

Intermittent: 12 units

In this course, students will explore Diversity, Equity, and Inclusion (DEI) issues as they relate to the School of Design to propose and possibly implement and initiate efforts to begin to address some of these issues. We will learn about the systems, structures, and tools for, by, and with Design at the intersection of DEI. Foundational lectures, discussions, and hands-on workshops combined with a review and consolidation of precedent research and work supporting the definition and scope of DEI. Through a variety of group exercises, directed working sessions, guest lectures by subject matter experts, readings, case studies, and more, students will be guided through an intensive learning process. Students will work individually and collaboratively, including working with the full course cohort. We will ask questions such as: What do we mean by DEI? What are the opportunities and challenges within the design discipline and its pipelines? Within design pedagogy and practice? With designers and designing? What happens if we put DEI at the center of our work? How do we develop new postures and mindsets that place DEI at the forefront of the School of Design at Carnegie Mellon University?