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://tenn-apps.as.cmu.edu/open/SOC/SOCServe/it) each semester for course offerings and for any necessary pre-requisites or co-requisites.

60-101 Transdisciplinary Research Studio I: Risk, Agency, Failure
Fall: 10 units
The first of the Transdisciplinary Research Studio foundation courses, Risk, Agency, Failure will be a primer course in thinking about the many ways that artists challenge conventions, experiment, and take risks through their artwork. The course will encourage students to explore foundational questions like: What can art uniquely do in the world? How can you playfully work with subjects and materials that are foreign and unfamiliar? How do you define success as an artist? How do you become comfortable with failure and remaking rules in art? The class will set up a structure for students to explore productive failure, encouraging them to take risks in a supportive environment and ultimately help students explore their own agency as cultural producers in the world. The course will additionally encourage students to explore the wide range of approaches to making that constitute artistic research. Students will play, experiment and explore, producing work from their unique perspectives and becoming comfortable with unfamiliar experiences, ideas, and materials. The class will have theory-driven prompts and no specific medium requirements.

60-105 Critical Theory in Art I
Spring: 9 units
Critical Theory in Art I is the first part of a year-long course intended to introduce students to key readings in the history of artistic theory, studied in relation with the concurrent development of Western and non-Western art. It is devoted to the period ranging from the 1400s to the end of the 1800s. The course is structured as a seminar discussion of theoretical texts, integrated with lectures. Readings will introduce students to the historical and critical background of the themes discussed in class and familiarize them with the varied methodologies and argumentative styles proper to art criticism, critical theory and philosophy. Open to first-year students in the School of Art, or by permission of the instructor.

60-106 Critical Theory in Art II
Spring: 9 units
This is the second part of a year-long course intended to introduce students to key readings in the history of artistic theory, studied in relation with the concurrent development of Western and non-Western art. It is devoted to the period ranging from 1900 to 1960 and covers major artwork and theories spanning from Cubism and the historical avant-garde to totalitarian art and 1950s artistic research worldwide. The course is structured as a seminar discussion of theoretical texts, integrated with lectures. Readings will introduce students to the historical and critical background of the themes discussed in class and familiarize them with the varied methodologies and argumentative styles proper to art criticism, critical theory and philosophy. Open to first-year students in the School of Art, or by permission of the instructor.
Prerequisite: 60-105

60-110 Electronic Media Studio: Introduction to the Moving Image
Spring: 10 units
Electronic Media Studio: Introduction to the Moving Image is an introduction to the computer as a dynamic tool for time-based media production. In this course students develop skills in digital video and audio production through the exploration of narrative, experimental, performance, documentary and animation themes and forms. Historical and contemporary works are presented and discussed to provide a context for studio projects. Open to first-year students in the School of Art, or by instructor permission.

60-125 IDeATe: Introduction to 3D Animation Pipeline
Fall and Spring: 12 units
This class will explore computer animation as it pertains to a professional animation production pipeline. The course is designed to give students exposure to key job descriptions that align to the animation industry. Topics covered include: character design, world building, storyboarding, digital sculpture, look development, rigging, layout, animation, cinematography, lighting, and rendering. These topics are taught in 2-4 week sprints that allow a student to learn the fundamentals of each craft. In a mixture of class lectures, critiques, and training workshops, students will become acquainted with the necessary skills needed to create their own characters and animations. By completion of the course, students will be familiar with industry-standard best practices and ready to take advanced courses related to animation, vfx, and video game related pipelines. This course specifically offers insight on how the craft of animation is always evolving at top studios such as Walt Disney Animation Studios, Pixar, and Industrial Light and Magic.
Course Website: http://cmuanimation.weebly.com/

60-126 Introduction to Performance Capture and Rendering
Intermittent: 6 units
[IdenTe course] This mini is designed for those interested in the growing world of performance capture and visual effects. Utilizing the advanced motion capture facilities at Carnegie Mellon and the Kinect, students will learn how to capture motion from performance and apply it to CG characters and objects. While this technique is found in many video games and vfx movies, it has the ability to create endless possibilities within the realm of computer graphics and experimental animation/art. Students will also become more familiar with the process of rendering to create the necessary polish for their animations/visualizations. CG Lighting, camera work, and material shading are just a few of the many topics covered in this course.
Prerequisites: 15-104 Min. grade C or 62-150 Min. grade C

60-128 IDeATe: Real-Time Animation
Fall: 10 units
An introductory course that explores improvisational strategies for making animation within real-time computer graphics frameworks. Advancements in motion capture technologies, real-time 3D computer graphics engines, and visual programming tools for AV synthesis provide open frameworks for the exploration of animation in spatial and interactive contexts. Studio work will explore real-time animation in a variety of contexts, including screen-based interaction, site-specific installation, and spatial immersion. Conceptual frameworks drawn from the histories of video art, animation, and immersive media design will inform collaborative group work and class discussion.
Students without the prerequisite may register by instructor permission.

60-131 3D Media Studio I: Foundations in Sculpture, Installation, and Site work
Fall: 10 units
3D Media Studio I: Foundations in Sculpture, Installation, and Site work is a foundational introductory studio course in concepts, techniques, and toolsets for the fabrication of three dimensional physical works. This in-person studio introduces both digital and physical fabrication methods to translate a wide array of materials and ideas into 3D forms. We will cover additive and subtractive processes, joinery techniques, pattern-making from surfaces, and rapid and not-so-rapid prototyping and replication methods. With the help of demonstrations, assignments, and safe hands-on exploration, students will find themselves traversing and learning equipment located within our woodshop, digital fabrication spaces, metal shop and more. Through projects, presentations, readings, and class dialogue, students will be introduced to contemporary artists working across 3D physical media, and we will discuss foundational concepts relevant to sculpture and object making throughout history and today. Concepts explored as a group include physical and sensorial properties such as scale, weight, materiality, and connectivity, as well as function, transformation, translation, identity, and interactivity. Our experiments will prompt us to consider relationships between objects, bodies, spaces, and society; as well as between technology, craft, form, and language; ultimately exploring how to use the making of 3D objects as both a communicative tool and a practical tool for life.
60-133 3D Media Studio II
Spring: 10 units
An introduction to three-dimensional form and fabrication processes. Various methods are explored through projects covering a broad range of sculptural concerns. Each section of 3D Media Studio II has a different topic: Section A: Physical Computing - In this course students will create physical kinetic sculptures, conceptually oriented screen based work, and pieces that their cohort can interact with from anywhere in the world. This introductory course will cover the basics and beginnings of electrical circuits, sensors, mechanics, and coding, while focusing on art as the end product. We'll discuss concepts and topics ranging from how physical computing is currently used in the art world to how we can make our current digitally dominated lives a little more physical.; Section B: Digital Fabrication II - As a sequel to the remote 3D Media 1 course, this section is an intermediate exploration of digital fabrication making use of software for 2d and 3d vector graphics and hardware such as 3D printers, laser cutters, and the CNC router. From digital design to physical finish, students will construct sculptures and installations that address the nature of our hybrid digital-physical lives.; Section C: Mixed Media/Mini Installation - Explores a range of sculptural materials with an emphasis on mixed media; a hands-on approach to working with a variety of materials and combining them with an array of connections to form a conglomeration of objects/subjects into an immersive mini installation. Students expected to learn a variety of skills and vocabulary related to mixed media sculpture, assemblage, installation and site work. In The Time of Coronavirus, the form of sculptural outcomes will emphasize the importance of online viewing and documentation with a theme of: Fabricated to be photographed, videographed, or to be performed in. Open to first-year students in the School of Art, or by instructor permission. Prerequisites: 60-131 or 60-132

60-141 Black and White Photography I
Fall and Spring: 10 units
This course will teach you the basic craft of photography from exposure of the negative through darkroom developing and printing to print finishing and presentation. Content includes student presentations, class discussions, shooting assignments, darkroom sessions and class critiques. We will concentrate not only on the technical aspects of photography, but also the aesthetics of seeing with a camera. The course concentrates on photography as a fine art – what is unique to it and the concerns that are shared with other visual arts, such as composition, tonal values, etc. and aims to equip students with an understanding of the formal issues and the expressive potentials of the medium. Description addendum for section B, REMOTE ONLY: This virtual studio course explores all of the topics described above but does so within a digital framework. Students will learn the theory of analog monochrome photography without using a physical darkroom, incorporating modern digital imaging systems into a traditionally-informed practice.

60-142 Digital Photography I
Fall and Spring: 10 units
This course explores digital photography and digital printing methods. By semester's end students will have knowledge of contemporary trends in photography, construction (and deconstruction) of photographic meaning, aesthetic choices, and the use of color. Students will learn how digital cameras work, proper digital workflow, RAW file handling, color management and Adobe Photoshop. Through the combination of the practical and theoretical, students will better define their individual voices as photographers. No prerequisites. Digital camera required.

60-150 2D Media Studio: Drawing
Fall: 10 units
This course focuses on the language, materials and concepts of drawing as foundation for all the visual arts. Initial emphasis on the development of perceptual, analytical, and structural drawing skills with increasing attention to idea development. Exposure to methods of creating pictorial and illusionistic space; recording the external world of light and form; and making visible the internal world of the heart, the mind, the soul. Experience with line, texture, tone, shape and mass; in a variety of wet and dry drawing media. Open to first-year students in the School of Art, or by instructor permission.

60-170 2D Media Studio: Painting
Spring: 10 units
This course serves as an introduction to technical, conceptual and historical practices of painting. Through a variety of painting experiences and presentations using acrylic media, students progress from observational exercises and exposure to materials and techniques to developing personal processes, imagery and ideas. Class sessions include technical demonstrations, illustrated lectures, personal and group critiques.

60-200 Sophomore Review
Fall and Spring
Students present their work and their ideas about their work to a faculty committee. A successful review is required for advancement to the junior year. Although this is a non-credit course, it is required of all Art (BFA, BHA, BSA, and BCSA) sophomores.

60-201 Transdisciplinary Research Studio II: Publics
Fall: 10 units
The second Transdisciplinary Research Studio, Publics, introduces students to the wide range of approaches artists use to engage with different audiences, contexts and publics. TRS II: Publics acknowledges that all artwork exists within specific social and political conditions and embraces that context as a fundamental material of art-making. In this course, students will be asked to consider what artists' roles and responsibilities could be - culturally, politically, and socially. Throughout this course, students will be introduced to interdisciplinary cultural practices which seek to critique, challenge and alter public systems and ultimately create artworks which explore power dynamics, subjectivity, institutional frameworks, accessibility and more. Through the production of art engaging with a variety of publics, real and virtual, students will explore the possibility of becoming active change agents in the world through making. This course will follow a similar format to the first Transdisciplinary Research Studio; students will respond to theory-driven prompts and are encouraged to take risks and explore a variety of different approaches to art-making, as each assignment will not have a specific medium requirement. Prerequisite: 60-101

60-202 Transdisciplinary Research Studio III: Futures
Spring: 10 units
In the third and final Transdisciplinary Research Studio: Futures, students will be asked the question, "what if?" Looking backwards and forwards students will grapple with what futures might be possible, impossible, desirable, undesirable and more. Throughout the class, students will explore critical and imaginative world-making and utopian, dystopian, and ambiguous scenarios from a variety of perspectives through the act of making. In addition to speculating and inventing futures, students will explore various histories of the future - through mythologies, origin stories, science fiction, futurist movements across cultural contexts, and more. Students will respond to theory-driven prompts and are encouraged to take risks and explore a variety of different approaches to art-making, as each assignment will not have a specific medium requirement. Prerequisites: 60-101 and 60-201

60-205 Critical Theory in Art III
Fall: 9 units
The Duchampian attack on traditional aesthetic categories has been the engine behind the distinctive shifts in postwar art. Photography, performance, conceptual proposals, installation art, film, video, and appropriations from mass culture play an equal part in contemporary visual culture. Duchamp's attack on art as an institution set the tone for other anti-modernist projects to follow which did not accept the "white cube of the gallery" as their sole exhibition space (or measured worth as an artist). His notions of "indifference, " (critique of aesthetic judgment), reproducibility, simulation, performativity, artist-as-curator, and interactivity between the spectator and the work of art set the stage for a host of innovative explorations by artists ranging from the Combinis of Robert Rauschenberg to the Mod-Spaceships of Mariko Mori. This seminar examines a tumultuous period in contemporary art and culture from 1960 to the mid-eighites, with special excursions into the aesthetics of commodification, phenomenology, materialism, conceptualism, semiotics, abjection, and technology. The impact of social movements and American foreign policies (i.e. Vietnam, Civil Rights, The Women's Movement, Globalism, the Aids Crisis) on the production and reception of contemporary art will also be examined. Open to sophomores in the School of Art, or by instructor permission.

60-206 Sophomore Review
60-206 Critical Theory in Art IV
Spring: 9 units
This seminar examines a period in contemporary art from the mid-1980s to the present in which artists and theorists questioned the differences between the politics of representation and, inversely, the representation of politics. Reeling from the AIDS crisis, the continuing and rising conflicts of post-colonial struggles, as well as the growing sense of a radical call for the recognition of, to borrow from Fred Moten, an undercommons-the under-legalization of the object of Art was evidently not sufficient for this leading critical, aesthetic discourse. The notion of a critical "After-ness," i.e. Post-Modem, Post-Medium, Post-Internet was the desire for a serious recognition of multiple social and aesthetics definitions at the level of interactions (both inside and outside contexts of the arts). Critics of the Subject, of Cartesianism, of Whiteness, of Patriarchy, of Cis-Genderism, of Binarism abounded and works of art like Andres Serrano's Piss Christ (1987) or Chris Ofili's The Holy Virgin Mary (1996) were emblematic of the attack many artists staged on intolerance that gave rise to national and international political debates about the role of "Art" in culture and civic life. We are still feeling the effects of these struggles - this seminar will attempt to make sense of this history, examining what has come to be termed the "Culture Wars," of the late 1980s and early 1990s in which issues that had been so hard-fought for in the sixties, i.e. women's rights over their own bodies, protection of the environment, issues of racism (recognition of difference), freedom of speech, separation of Church and State were under threat again. Specific excursions will be made into theories of abjection, intersectionality, precarity, relational aesthetics, and performativity. New media technologies, and especially the centrality of Social Media and Information Cultures, will be a special focus of the final weeks of the course.
Prerequisite: 60-205

60-208 Alternative Photography: Contemporary Antiquarian Printmaking
Intermittent: 5 units
This focused, making-based course explores antique, handmade printmaking/photography methods through contemporary techniques. Students will learn how to make light-sensitive papers, while creating their own negatives digitally, combining both processes in a traditional darkroom. Students will use the Van Dyke, Cyanotype, and Platinum printing methods from start to finish, creating handmade, unique images that are distinct from those made with digital processes alone.

60-210 Electronic Media Studio: Introduction to Interactivity
Fall: 10 units
Electronic Media Studio: Introduction to Interactivity (60-210) is an introduction to several tools for programming and computational media production within the context of the arts. In this course students develop the skills and confidence to produce interactive artworks, discuss their work in relation to the tradition of digital art, and engage new technologies critically.

60-212 Electronic Media Studio: Interactivity and Computation for Creative Practice
Intermittent: 12 units
This is an intermediate level course in "creative coding", interactive new-media art, and computational design. Ideal as a second course for students who have already had one semester of elementary programming (in any language), this course is for you if you'd like to use code to make art, design, architecture, and/or games -- AND you're already familiar with the basics of programming, such as for( ) loops, if( ) statements, and arrays. This course satisfies the EMS-2 (60-210: Interactivity) requirement for BFA and BXA-Art majors. As with EMS-2, students in this course will develop an understanding of the contexts, tools, and idioms of software programming in the arts. Unlike EMS-2, this course additionally satisfies the computing portal requirement for CFA and Dietrich students pursuing IDeATe minors and concentrations. (Students with no prior programming experience should register instead for 15-104, 15-110, or 15-112.) This is a "studio art course in computer science," in which the objective is art and design, but the medium is student-written software. The course develops skills and understanding of text-based, imperative programming techniques in a variety of popular open-source arts-engineering toolkits, including p5.js (JavaScript), Processing (Java), and openFrameworks (C++), with the aim of applying such skills to interactive art and design, information visualization, generative media, and other creative cultural practices. Rigorous programming exercises will develop the basic vocabulary of constructs that govern static, dynamic, and interactive form. Topics include the computational manipulation of: point, line, shape, text (type and color); time, change and motion; reactivity, connectivity and feedback; interactive graphics, sound, and simulation; and the incorporation of various modes of input (sensors, cameras) and multimedia output.
Prerequisites: 15-110 Min. grade C or 15-112 Min. grade C or 15-104 Min. grade B

60-214 Photography and the Narrative of Place
Intermittent: 5 units
This half-semester course will use photography to develop understandings of our surrounding environments. Students will choose a single location to work on in photographing and researching its function in the community, its history, and its relationship to broader concepts and similar spaces. Weekly assignments will require students to work with a variety of photographic methods to construct a narrative that derives meaning from the complex connection of objects and the spaces they inhabit. Throughout the course, students will strengthen their understanding of the ways in which these tangible and abstract elements of our environments work together through in-class exercises, weekly discussions and critiques. The course will culminate in a portfolio of the completed project. The class will study work and books by notable and emerging figures in the medium, including Robert Adams, Carolyn Drake, Roy DeCarava, Rinko Kawauchi, Alec Soth, Carrie Mae Weems, Zoe Strauss, Gregory Halpern, and Susan Lipper. Required readings will include essays and short stories by Wendell Berry, Rebecca Solnit, Teju Cole, Joan Didion, and Georges Perec.

60-218 IDeATe Portal: Real-Time Animation
Fall: 10 units
An introductory course that explores improvisational strategies for making animation within real-time computer graphics frameworks. Advancements in motion capture technologies, real-time 3D computer graphics engines, and visual programming tools for AV synthesis provide open frameworks for the exploration of animation in spatial and interactive contexts. Studio work will explore real-time animation in a variety of contexts, including screen-based interaction, site-specific installation, and spatial immersion. Conceptual frameworks drawn from the histories of video art, animation, and immersive media design will inform collaborative group work and class discussion. Students without the prerequisite may register by instructor permission.

60-220 IDeATe: Technical Character Animation
Fall: 10 units
Technical Character Animation is a deep dive into the fundamental concepts of character animation and "The Illusion of Life." This class will focus on building a foundation of body mechanics that demonstrate weight, balance, and authenticity. Through a series of strategically designed modules, students will gain a command of the 12 principles of animation, beginning with a ball bounce to more advanced block, spline, and polish workflows. This course is designed to give students exposure to the art of movement as it is done by animators in the fx, film, and game industries.
Course Website: http://tcacmu.weebly.com/

60-223 IDeATe: Introduction to Physical Computing
Fall and Spring: 10 units
Physical computing refers to the design and construction of physical systems that use a mix of software and hardware in order to sense and respond to the surrounding world. Such systems include digital-physical tools and gadgets, kinetic sculpture, functional sensing and assessment tools, mobile instruments, interactive wearables, etc. This is a project-based course that deals with all aspects of conceiving, designing and developing projects with physical computing: the application, the artifact, the computer-aided design, specific installation, and prototyping facilities. The class consists of students from different disciplines who collaboratively synthesize and implement several systems in a short period of time. The course is organized around a large set of essential skills that students must gain in order to effectively tackle physical computing problems. It is then deployed through a series of quick group projects that utilize the essential skills and challenge students to not only consider HOW to make things, but also for WHOM we design, WHEN the time is ripe, and WHY the making is worthwhile/necessary. Upon completion of this course the students will be able to: work in a mixed physical-digital environment and laboratory, make effective use of standard hardware and software tools for physical computing, approach complex physical computing problems with a systematic overview that integrates iterative research and design steps, generate systems specifications from a perceived need, partition functionality between hardware and software, produce interface specifications for a system composed of numerous subsystems, use computer-aided development tools for design, fabrication and testing and debugging, evaluate the system in the context of an end user application or experience. Students are encouraged to also take the micro course 99-353 IDeATe CAD and Laser Cutting.
Course Website: https://courses.ideate.cmu.edu/60-223/ (https://courses.ideate.cmu.edu/60-223/)

School of Art Courses 3
School of Art Courses

60-240 Unfolding Environments: The Intersection of Person and Place
Intermittent: 10 units
In this course students will use photography to develop projects that study the social environments and personal landscapes. This studio explores the ways photography can combine form and concept to derive meaning from place. Students will be assigned two projects for the semester. The first will be a brief study of a familiar space. The second will comprise the remainder of the semester, concentrating on a single location of the student’s choosing. Students will photograph and research their chosen place’s function, its history, and its relationship to broader concepts and comparative spaces. A series of prompts, readings, lectures, and critiques will help students begin the project and develop new ways to approach their subject matter as they create a long-form narrative.

60-241 Black and White Photography II
Fall and Spring: 10 units
This course allows you to gain experience with medium and large format film cameras while emphasizing aesthetic development and personal artistic growth. As an advanced student, you have access to an unusual assortment of panoramic and pinhole cameras that will change the way you make photographs, revealing unknown perspectives. Additional topics include digital process though negative scanning and inkjet printing, advanced monotone printing methods, and a focus on exhibition and folio presentation. Cameras will be supplied for this course.
Prerequisites: 62-141 or 60-141

60-242 Digital Photography II
Intermittent: 10 units
Digital Photography II combines digital and analog processes in both color and black and white. Students will gain experience with digital workflow, analog to digital conversion, virtual drum scanning and large format digital printing. Topics include trends in contemporary photography, professional practices, project development, narrative and serial work, and portfolio presentation. Students will be expected to develop their own self-directed projects throughout the semester culminating in a cohesive portfolio of their work. Readings, assignments, artist visits, critiques and discussions will give context to the practical work and help develop a wide ranging familiarity with the subjects.
Prerequisites: 62-142 or 60-141 or 60-142 or 60-141

60-244 Contemporary Photo Theory
Intermittent: 9 units
Because, you know, the photographs are more a question than a reply. (Sebastiao Salgado) A photograph is a moral decision taken in one eighth of a second, or one sixteenth, or one one-hundred-and-twenty-eighth. (Salman Rushdie) This seminar investigates current topics in photography and the image. Our current understanding of photo theory applies to current practice from both the viewpoint of maker and consumer. The course is designed to address philosophical issues for photographers working now and will favor conversation over written work; students are expected to fully participate in critical analysis and discussions. Readings include works by Roland Barthes, Stephen Shore, Susan Sontag, Hollis Frampton, John Szarkowski, Robert Adams, Italo Calvinio, Berenice Abbott, John Berger and James Elkins. No pre-requisites.

60-245 Portrait Photography
Intermittent: 10 units
Portraiture maintains a unique standing in photography for its direct and collaborative relationship between an individual and a photographer. This course will examine this relationship and the larger contexts which provide the conceptual framework for deriving meaning and understanding from an image of another person. We will study the theoretical and practical aspects of portrait photography in both studio and environmental settings, providing students with an understanding of the genre by developing both technical and conceptual skill sets. Students will utilize analog and digital equipment, learn studio lighting techniques, develop approaches to working with natural light, and explore methods of printing and presentation.

60-251 2D Media Studio: Print Media
Fall: 10 units
Printmaking is a process based medium that produces multiples of original artworks. Students will create four works on paper using the following printmaking approaches: Relief (carved), Intaglio (engraved), Lithography (planographic), and Screen Printing (stencill). Each technique’s unique set of materials, processes and aesthetics will be explored. This course focuses on traditional tools and processes, but will include utilization of digital images and sources through a critical lens. While primarily focused on the learning of fundamental techniques, the class will also expose students to ways that Print Media can be a tool (physically and conceptually) in contemporary practice. Open to sophomores in the School of Art, or by instructor permission.
Prerequisite: 60-160

60-260 2D Media Studio: Imaging
Fall: 10 units

60-333 IDeATe: Animation Rigging
Spring: 10 units
Animation Rigging explores processes for building digital skeletons and control systems to drive computer animated forms. This course investigates vital techniques and core concepts to create expressive, fully articulated characters for computer animation, film, and game production. Beginning with rigging fundamentals, coursework will advance through various systems and methods that are needed to convey movement and expression in a variety of character forms. Certain key topics include kinematics, joint orientations, driven keys, direct connections, space switching, corrective blend-shapes, custom attributes and graphic user interfaces (GUIs), skinning and deformation. Additionally, coursework provides an introduction to scripting methods for rig creation, including expressions, Python, and MEL. Students will be provided a valuable range of tools that meet production standards for animated film and game creation, as well as a necessary conceptual framework to enable complex problem solving at all levels of rig creation. Anyone interested in the artistic and technical sides of computer animation are encouraged to enroll. Previous experience with Autodesk Maya/3D animation is preferred.

60-335 IDeATe Special Topics in Animation: Story Development
All Semesters: 6 units
‘IDeATe Special Topics in Animation: Story Development provides insight and strategy for animated storytelling in film and media production. This mini-studio seminar draws upon diverse historical examples to highlight storytelling strategies across cultures and production paradigms. Over this seven-week course, students will develop their own original stories in the forms of scripts and pitch packets, to be later produced as animated content. Discussion and critique will cultivate storytelling skills with greater understanding for audience, form, and cultural context, providing essential tools for communication through animation.

60-337 IDeATe Special Topics in Animation: Storyboarding
All Semesters: 6 units
‘IDeATe Special Topics in Animation: Storyboarding focuses on the translation of stories and ideas into sequential image boards for animation. This mini-studio seminar exposes the visual grammar of filmic storytelling through analysis and production of storyboards and animations. Over this seven-week course, students will develop their own original storyboards and animatics, to be later produced as animation. Analysis of historical examples will reveal strategies for storytelling through sequential narrative and animation. Discussion and critique will cultivate storytelling skills with greater understanding for audience, form, and cultural context, providing essential tools for communication through animation and design.

60-350 Professional Development for Creative Practices
Fall and Spring: 9 units
This course is intended to expose students studying in creative fields to the basic principles, skills and functions of business used every day in creative practices and industries. Supporting a creative practice - whether an individual studio practice, a temporary collaboration or commission, or an incorporated business or non-profit - all require a foundational knowledge of basic organizational, legal, and financial structures and practices. Throughout this seminar-style course, students can expect to develop a starting knowledge of basic business concepts; learn a foundational understanding of ethics and best practices in business; develop problem-solving skillsets and methodologies for managing creative projects and programs; and practice applying these learnings to their own creative practices. Topics covered will include, but are not limited to: basic business structures; intellectual property; Contracts and employment; methods for generating income and fundraising; financial management and taxes; marketing and communications; negotiation and compromise; and elements of business strategy development. This course assumes no prior background in business education or administration experience.

60-351 Making your way: Mapping a career path in an uncharted world
Intermittent: 9 units
Building a career as an artist is a nuanced endeavor that looks different for each individual. Unlike other fields, where a set professional structure usher students graduating into a career, the artworld is self-navigated. This course provides students with the awareness, skills, and resourcefulness they need to chart their own course as a studio-based fine artist in an artworld that’s ever-changing.
60-352 NOISE: Toward a Critical Theory of Sound and Hearing  
Intermittent: 9 units  
This seminar will explore audio art in its widest sense: sound sculpture and installations, radio art, the soundtrack, just about anything audible but not conceived as music. Special focus on the production (and reception) of sound by artists, amplifying those creative efforts that, in having explored acoustics, soundscapes, and listening, might also serve to inspire students to incorporate sound in their own work. Contemporary critical theory, by and large, is still glaringly silent on aurality and auditory phenomena; it seriously fails to consider sound as an object of study, instead focusing quite exclusively on visual culture (film, TV, video, computer screens, which are, of course, technologies of vision and sound). This seminar will address this roaring silence by examining some suggestive but disparate theoretical work related to sound and by engaging with a range of artistic practices that explore the production and reception of sound itself.

60-353 Critical Studies: Media Performance - History, Theory, and Contemporary Practice  
Intermittent: 9 units  
During the last decade of the twentieth century, new technologies have transformed the way we think about live performance. By examining the use of media (analog and digital) across the areas of sound/music, dance, theater, performance art, gaming, and installation, this course will traverse multiple theories and practices of performance history. With an eye to how changing theories of performativity have influenced how artists think about what it means to “perform,” this seminar, in a sense, will be engaged in both philosophical and aesthetic research about how technology has changed the conventions of performative artistic practice. What was the role of technology in the de-materialization of the object of art? How have ideas about virtual, parallel worlds changed the way artists think about the “performing body”? If technology once acted as a prosthetic device, increasing an artist’s sensual and perceptual world, what happens to the role and impact of an artist’s work in the seemingly inert realms of programming or the increasingly autonomous areas of Robotic Intelligence? What does art look like in a post-internet age?

60-356 Critical Studies: Once Upon A Time: A Survey of International Fairy Tale Film  
Intermittent: 9 units  
Fairy tales have been a part of cinema from the beginning. Since George Melies 1899 Cinderella, filmmakers from across the globe have returned to the genre not only for escape into enchanted worlds, but also for social critique, with stories of injustices avenged, class oppression overcome and gender roles expanded. In this course we will decenter the narrow conception of the genre fixed by Disney and Hollywood directors to examine fairy tale films from around the world. We will encounter the emergence of a renewed poetics and politics of wonder in international films about transformation, wish-fulfillment and reversals of fortune that deliver a situated counterpoint to the hegemony of a colonizing and commercialized poetics of magic. The transformative power of fairy tales can be approached from a variety of angles. We will analyze how stories themselves function as shape-shifters, moving into new versions of themselves as they are retold and as they migrate into other media. Beyond looking at the films as texts we will consider the affective qualities of how their formal and aesthetic aspects create wonder, delight, humor, apprehension and terror. What are the stakes of fairy tales varied transformations today, for whom? Films screened may include: Kwaïdian (Japan, 1964), Barbe Bleue (Bluebeard, France, 2009), El Laberinto del Fauno (Pan’s Labyrinth, Mexico-Spain, 2006), Xala (Senegal, 1975), The Mermaid (China/Hong Kong, 2016), The Juniper Tree (Iceland, 1990), Peau d’Ane (Donkey Skin, France, 1970), Drei Haselnusse fur Aschenbrodel (Three Wishes for Cinderella, Czechoslovakia-GDR, 1973), In The Company of Wolves (UK, 1984), Hansel and Gretel (South Korea, 2007), November (Estonia, 2017), Tropical Malady (Thailand, 2004) and many more.

60-362 Art Writer  
Intermittent: 9 units  
ART WRITER will strive to bring together the intersecting discourses of artists use of writing as an object, art criticism, as well as experiments by both artists and critics to use theory as invention. The idea of discourse employed here emphasizes the urgency that art writing move beyond its own history, beyond the received understanding of its proper practices in order to propose new modes of critical reflection. The form and material force of language will be explored through the conceptual and critical work of Dan Graham, Lawrence Weiner, Donald Judd, Lee Lozano, Joseph Kosuth, Vito Acconci, Mel Bochner, Eleanor Antin, and international projects of Art and Language, Fluxus, as well as more recent iterations. This is a writing intensive seminar with experimentation at its core. Members will workshop their writing: revise, rethink, perform, and publish.

60-365 Critical Studies: Queer Power in Art Theory  
Intermittent: 9 units  
Queer power is a form of (anti-)knowledge that demystifies phallogocentrism and neuters heteronormativity. This class examines how queer theories empower - and can originate in - art making and its history. Over the course of the semester, students discuss recent publications in the field such as Rogers Brubaker's trans: Gender and Race in an Age of Unsettled Identities (2016) and Paul B. Preciado's Trans Zentrum: Sex, Drugs, and Biopolitics in the Pharmacopornographic Era (2013). Students also investigate recent exhibitions exemplifying oppositional epistemology such as Trigger: Gender as a Tool and a Weapon (The New Museum, 2017-18) and Hide/Seek: Difference and Desire in American Portraiture (National Portrait Gallery, 2011). Interweaving the canons of queer thoughts with newer voices such as Lee Edelman, Tim Dean, and Maggie Nelson, this class contextualizes Paul Mpagi Sepuya, Tschefalsala Seif, Wu Tsang, and other artists who embody queer power today.

60-366 Culture in the Public Realm  
Intermittent: 9 units  
The seminar offers a discerning critical overview of key concepts about culture, public space and the public sphere. We will introduce and critically explore the historical, theoretical and practical production and use of ‘public space’, and art/culture beyond the museum or gallery. We will consider the historical evolution of the city as both an actual and theoretical entity. The class will explore urban environments in terms of economics, demographics, political, cultural production and psychology and the city of Pittsburgh will function as our site laboratory. We will inquire about the function of public art/what happens when space is required for the public realm for a means of cultural production that aims to yield some form of transformative effect for the ‘Public’ or citizens at large. Moreover the term “public” is an important topic to be investigated: Who is the public? Who is the audience? This interdisciplinary course will consider and examine the interplay of artists and their public and how certain belief systems of a society at a specific time are able to influence a culture's perception of art. What is the role of the artist, critic, curator and urban planner in relation to the public and what is at stake in utilizing public space as a platform for art and other forms of cultural production? We will reflect on why we have become in recent times so preoccupied with public space as a platform for cultural production. Changing attitudes among artists and in museums have played a role in this cultural shift and theory. We will query a range of cultural mediums in order gain insights into the construction of public culture. The means to inspect the varied issues will go beyond assigned readings: it will include class discussions, personal reflections, writings, videos and guest speakers from the field of architecture, public policy, art, and public art. A conjoint class student project will take place to further probe this subject.

60-371 Breathless: International New Wave Cinemas  
Intermittent: 9 units  
What does Jean-Luc Godard’s “Breathless [À bout de souffle] (1959) have in common with Wong Kar-Wai’s “In the Mood for Love” [Fa yeung nin wa] (2000)? What does Satyajit Ray’s “Pathe Panchali” (1955) share with Mark Pajore’s “The Glass System” (2000)? By examining an array of films from the classic days of International New Wave Cinemas, beginning with French Nouvelle Vague, Indian “Parallel Cinema,” as well as German, Italian and Japanese innovations and moving to contemporary (and experimental) film movements in Iran, Korea, Hong Kong, Eastern Europe, and the US, we will explore the ways a handful of young directors found novel ways to fund and shoot their movies in direct defiance of commercial, narrative, and cultural norms. By focusing on mise-en-scène over thematics, on-site location studies over studios, lesser-known actors over box-office idols, and small production teams over professional crews, these directors were able to turn low-fi aesthetics and financial shortcomings into a radical new filmic style. Especially central here will be how forms of cinematic experimentation translated internationally—and how these approaches continue to challenge hegemonic forms of media culture.

60-380 Color Photography and Digital Output  
Fall and Spring: 10 units  
This is a course using digital photography with digital printing methods. Students will gain an understanding of color theory and aesthetics, while better defining their individual voices. By semester’s end, students will have a finely printed body of work using Mac OS, RAW file handling, color management and Adobe PhotoShop. Prerequisites: 51-265 or 60-141 or 62-141
60-388 Critical Studies: Black Utopias
Interruption: 9 units
In this course we will examine various utopian visions of Black Americans. Focusing on the 20th century up to present day, the class will research the Afro-Futurist and Afro-utopian ideologies found in literature, film, and art, and their opposition to canonical American utopian ideals. We will engage with the works of Zora Neale Hurston’s fieldwork-inspired Sun Ra’s Space Is The Place and Julie Dash’s Daughters of The Dust, how real movements like the MOVE House in Philadelphia inspired Octavia Butler to write Parable of the Sower, and more recently, how the oppression from the policing of African Americans can inspire Terence Nance’s new series, the Random Acts of Flynnness. The course is an exploration of the empowerment and self-determination that African Americans use to visualize a better world for themselves. Students will develop an awareness of how cultural criticism addresses the concept of utopia and how the concerns of this field pertain to African-American expression.

60-397 Critical Studies: Art and Conflict
Interruption: 9 units
These are turbulent times we are living through, with unnerving specters of conflict in seemingly irreconcilable political ideologies and environmental threat. What role do we have as artists within this malaise? Can art become a catalyst for meaningful change? This course will consider definitions of ‘conflict’ and look at artists whose work has responded to conflict, such as war and civil strife, and all manner of disputes from territorial to domestic. We will look internationally at colonial and imperial histories, and consider national struggles from Civil Rights to Black Lives Matter. We will examine how artists have expressed solidarity, observed, or engaged with ideological differences, abuses of power, injustice and the infliction of privilege; through commentary, protest, agit-prop and activism.

60-398 Critical Studies: Social History of Animation
Interruption: 9 units
Social History of Animation will investigate the history of animation from early experiments with trick film through the development of major studios, to independent animation, web based work and emerging forms. Animation will be analyzed and discussed in relation to the social movements and technological innovations that effected animators and their work. This class will read related texts and view examples from around the world to explore animation as a means for personal expression and as a reflection of the context in which they were made.

60-399 Critical Studies Independent Study
Fall and Spring: 9 units
A tutorial course in which an Art student works individually on a self-generated project under the supervision of a School of Art faculty member. Prior to enrolling in Independent Study, the student must complete an "Independent Study Proposal" form (available in the bins on the 3rd floor of CFA) which is signed by the faculty member and the Assistant Head of the School of Art. Prerequisite: Art junior or senior status, or by instructor permission.

60-400 Senior Review
Spring Students present their work and their ideas about their work to a faculty committee. This review affords graduating students the opportunity to analyze and summarize their work, and to engage a faculty committee in discussion about issues that face an artist preparing to enter a career in art. Although this is a non-credit course, it is required of all Art (BFA, BHA, BSA and BCSA) seniors.

60-401 Senior Studio
Fall: 10 units
The primary goal of Senior Studio is to create a context for students to develop and realize an ambitious and self-defined creative project. With the guidance of faculty, each student will pursue their own artistic goals and develop their ability to sustain focused artistic activity while developing their own voice. Additionally, Senior Studio will help students to: Foster a community and shared sense of purpose in an atmosphere of mutual support, critical dialog, knowledge exchange and camaraderie; Cultivate and apply professional practice skills by preparing for life after graduation; Participate in studio visits with a multidisciplinary team of faculty, visiting artists and critics; Collaboratively produce a successful Open Studio event on the last day of the semester.

60-402 Senior Studio
Spring: 10 units
Students continue a comprehensive two-semester capstone project. Each student pursues an ambitious and cohesive body of work with guidance by a team of School of Art faculty, Multimedia, multidisciplinary, and collaborative work is encouraged. Studio work is supplemented by group critiques, workshops on writing, professional presentation skills, career preparation, and technical instruction as needed. Attendance at all 6:30pm School of Art Lecture Series events is required for this class. Open to seniors in the School of Art, or by instructor permission.

60-403 Senior Critique Seminar
Fall and Spring: 10 units
Senior Critique Seminar comprised of group discussions that analyze the conceptual and aesthetic frameworks that surround each student’s individual studio practice. The course supports independent inquiry, mature studio practice and both an in-depth critical reading of visual art and an increased comfort in the articulation of ideas and processes. Each student can expect two or more hour-long critiques throughout the semester, paired with ample time for individual studio work. These course discussions will also be informed by the Visiting Artist Lecture series and concepts and concerns carried from studio and academic seminar classes.

60-406 Advanced ETB: Internet Resistance
Interruption: 10 units
Through booms and crashes, civilizations and disruptions, IPOs and LOLZ, Internet has been a spectacular laboratory of social conflict. But what can artists do on the net beside tweaking their pitiful portfolios and sinking into social media malaise? What is the function of the network in the age of pervasive surveillance, fake news, and filter bubbles? How to Internet under the First Troll President of the United States? Internet Resistance is both a schizo-seminar about critical issues in cyberculture and a trans-media studio to develop terrible ideas for the networked society. [http://internetresistance.molleindustria.org/ Prerequisites: 6-210 or 6-110]

60-407 IdeATe: Experimental Sound Synthesis
Spring: 9 units
This is a course that will guide students into the world of experimental approaches to music and sound production, with particular emphasis in some of the key practices and concepts developed in the 20th and 21st centuries. We will examine a variety of ways in which sound works are made and perceived; understanding the historical perspectives and critical viewpoints of each approach through the application of hands-on practicum. The topics covered in the course are divided into three large areas: the art of sound, the use of technology in the production of sound works, and the creation of interdisciplinary sound installation. Students from different disciplines will work together to collaborate on the designing, prototyping and execution of a series of ambitious projects in response to the topics covered in class.
Course Website: [https://courses.ideate.cmu.edu/57-344/]

60-408 Advanced ETB: Digital Storytelling and Resistance
Interruption: 10 units
Digital Storytelling and Resistance is a class through which students will explore the varied ways artists use contemporary technology to create complex alternative stories to dominant media narratives as well as the ways in which video, film, performance and media artists have historically used hybrid documentary storytelling practices and appropriation as a way to resist, respond to, and deconstruct one-dimensional news media and pop cultural stories. In this course students will create video essays, remix and appropriation-based works, hyperlinked interactive stories, modded games, written pieces and interactive moving-image based narrative works through new multimedia publishing platforms. Prerequisite: 6-110

60-409 Advanced ETB: Video & Performance
Interruption: 10 units
This course will concentrate primarily on the historical and ongoing relationship between video and performance. That said, this course will be flexible enough to allow students to create video, performance and video/performance projects. For structured projects, all students will be expected to participate in performance. Class time will be spent considering the history of performance and video/performance, viewpoints of primarily video/performance works to provide background and inspiration, presenting and critiquing student projects and studio time to work on projects. Technical instruction in video editing, composing and effects, audio recording/editing and midi applications will be offered on an as needed basis. Prerequisite: 6-110
60-410 Advanced ETB: Moving Image Magic: Visual Effects and Motion Graphics
Intermittent: 10 units
Fly like Harry Potter, fall into Alice's looking glass, create new worlds, or take a head-trip into the inner reaches of your subconscious. It's all possible in Moving Image Magic! This course serves as an introduction to the creation of extraordinary cinematic visions using a variety of analog and digital tools and techniques. These include: digital compositing, miniatures, motion tracking, rotoscoping, matte painting, puppets and motion graphics. Primary software tools are After Effects and Photoshop with forays into, Motion, Resolve, Logic and Smoke. Prerequisites: Electronic Media Studio: Introduction to the Moving Image or instructor permission.
Prerequisite: 60-110

60-412 Interactive Art and Computational Design
Intermittent: 12 units
This is an advanced studio course in arts-engineering and new media practice, with a special emphasis for Spring 2016 on mapping and information visualization using geographic data. Topics surveyed in the course will be tailored to student interests, and may include: experimental interface design, locative and mobile media, data-driven activism, image processing and computer vision-based interactions, and other topics. Through a small number of exploratory assignments and a public capstone project, students will bolster interdisciplinary problem-solving abilities and explore computation as a medium for curiosity-driven experimentation. Enrolling students are expected to have demonstrable programming skills, without exception, beyond the level of an introductory class such as 15-112. Although the course will provide technical overviews of major visualization toolkits (including D3, Processing, and openFrameworks), assignments may be executed in the student's preferred programming environment. Graduate students should register for section 51-882, 60-712, or 62-726, which meets with the undergraduate sections 60-412 and 51-482.
Prerequisites: 15-110 or 15-112 or 60-112

60-413 Advanced ETB: Real-Time Animation
Intermittent: 10 units
An exploratory studio that considers improvisational strategies for making animation within real-time computer graphics frameworks. Advancements in virtual production, real-time computer graphics engines, and visual programming tools for AV synthesis provide open frameworks for the exploration of animation in spatial and interactive contexts. Studio work will explore real-time animation in a variety of contexts, including screen-based interaction, site-specific installation, and spatial immersion. Conceptual frameworks drawn from the histories of animation, video art and Expanded Cinema, and immersive media design will inform collaborative group work and class discussion. Students without the prerequisite may register by instructor permission.
Prerequisites: 60-110 or 60-210

60-414 Advanced ETB: Animation Art and Technology
Spring: 12 units
Animation, Art, and Technology is an interdisciplinary course cross-listed between Art and Computer Science. Faculty and teaching assistants from computer science and art teach the class as a team. It is a project-based course in which four to five interdisciplinary teams of students produce animations. Most of the animations have a substantive technical component and the students are challenged to consider innovation with content to be equal with the technical. The class includes basic tutorials for work in Maya and Unity leading toward more advanced applications and extensions of the software such as motion capture and algorithms for animating cloth, hair, particles, and immersive technologies.
Prerequisites: 60-110 Min. grade C or 60-125 Min. grade C or 60-333 Min. grade C or 60-220 Min. grade C

60-415 Advanced ETB: Animation Studio
Fall: 10 units
This is an open animation studio for students who want to improve existing animation skills and develop a personal animated short. The class will introduce a variety of techniques and concepts for animation production. Using both 2D and 3D tools, animation will be explored through short assignments designed to develop diverse skills and ideas. Each student will develop and produce a short animation. The class will engage in discussion and critique of each others work along with examples of historic and contemporary animation.
Prerequisites: 60-110 Min. grade C or 60-333 Min. grade C or 60-220 Min. grade C or 60-218 Min. grade C or 60-125 Min. grade C

60-416 Advanced ETB: Documentary Storytelling
Intermittent: 10 units
In this class students will develop projects which use a variety of narrative concepts to convey stories in new ways. We will begin with a core practice around video, audio, and expand into internet media, performance, physical media and installation. Emphasis will be placed on story structure and strategies for choosing a media most appropriate to the narrative as well as the desired audience. Works by Janet Cardiff, Errol Morris, Spalding Gray, Werner Herzog, Laurie Anderson, This American Life and others will be mined for inspiration. With permission of instructor. We will also examine and discuss a range of historical and contemporary strategies employed by art makers who have used forums from on-line and virtual spaces to physical and site specific venues to expand and explore the relationship between the art object and the audience.
Prerequisite: 60-110

60-417 Advanced ETB: Moving Image Studio
Intermittent: 10 units
Moving images are everywhere! In the midst of the Covid-19 pandemic we probably spend more time looking at screens and moving images than ever before. Almost everything from art exhibitions, concerts, live theater, lectures, movies (the list is endless) is experienced on screens large and small. What approaches, experiments, themes and techniques will best serve your moving image media goals? Who is your audience? What communities and discourses do you want to participate in? You will begin to find answers to these questions and more. In Moving Image Studio students will create self-directed moving image experiments and projects. Students may choose from an expansive array of approaches including: narrative, animation, collage, found footage, activism, performance, essay, music video/visual music, documentary, abstract, personal, interactive audio-visual systems, hybrid forms and more. Class time will consist of screenings/discussions of contemporary and historical moving image media, visiting artist presentations, technical and conceptual workshops and tutorials, studio time and presentation and feedback of student work. Additionally we will research and discuss the ever changing contexts for the creation, exhibition and distribution of moving image media. Readings will include theoretical, historical and critical texts exploring the past, present and future of the moving image. Each student will receive an iPhone 11 Cinematography Kit for the duration of the semester. In-depth Smartphone Cinematography workshops and tutorials will be available.
Prerequisite: 60-110

60-419 Advanced ETB: Experimental Game Studio - No More Video Games!
Intermittent: 10 units
Experimental Game Studio: No More Video Games! Let's face it: there are too many video games in this world. Luckily, game engines and game design principles can be used for a variety of purposes! This installment of Experimental Game Studio focuses on artful software, interactables, non-games, digital toys, procedural generators, educational applications, and other playthings. The course is divided in two parts: in the first half of the semester students will be asked to create a prototype every week starting from an open-ended prompt. In the second half, the most promising prototypes will be iterated, playtested, and polished into complete projects. Students will work in teams, and will be introduced to a variety of tools for remote collaboration. Some programming experience is recommended but not required.
Prerequisites: 60-210 Min. grade C or 15-112 Min. grade C or 15-104 Min. grade C or 60-212 Min. grade C or 15-110 Min. grade C
Course Website: http://mycourses.es/gamesesign2020/

60-422 Advanced ETB: Experimental Animation
Spring: 12 units
[IdEaTe course] This class will examine animation production from the student's perspective. Animations that explore both form and content will be developed and discussed. Topics will include: non-linear narrative, visual music, puppetting, non-traditional materials, manipulation of motion and performance capture data and immersive environments.
Prerequisites: 60-110 or 60-220 or 60-333
60-425 Adv. ETB: (Im)Possible Worlds: 2D Animation, Motion Graphics and Visual Effects
Intermittent: 10 units
While developing proficiency in Adobe After Effects (and other tools) students will explore the experimental worldbuilding and storytelling possibilities of hybrid moving image media. This course is structured around technical tutorials and workshops, readings and screenings, the creation of collaborative and individual moving image projects, discussion and critique. Some of the themes we will explore include: "The Fantastic" as expressed in the genres of horror, science fiction and fantasy. Artists whose work we will look to for inspiration include Jacoby Satterwhite, Shana Mouton, Rachel MacLean, Rachel Rose, Charles Atlas, Sondra Perry, Max Almy, Nam June Paik, Stan Van Der Beek, Zach Bis, Laurie Anderson, Cecile B. Evans, Ryan Trecartin, and many others.

60-428 Advanced ETB: Drawing with Machines
Intermittent: 12 units
This is an advanced studio course in experimental drawing, generative art, computational design, and mechatronic mishaps. Working at the boundaries of code, automation, physical materials, and gestural mark-making, we will explore personal and peculiar new approaches to digital fabrication; the development of ultra-niche workflows as a mode of creative practice; and the use of algorithms and machine collaborators as nontraditional intermediaries between mind, hand, and paper. Units in this course include: rule-based art and conditional design; chance and stochastic composition; real-time interaction and contingency; asemic cartography; synthetic automatism and ersatz perception; and more. Through rigorous exercises in freestyle computing, participants will develop skills in the control of machines by (e.g.) AxiDraw, Line-Us, Scribit, Rotrics, and Universal Robots to govern line, texture, tone, shape and mass in a variety of wet and dry drawing media. Interested students should have a portfolio of creative visual work, and programming experience equivalent to an introductory course such as 15-104, '110 or '112. Enrollment by permission of instructor.

60-429 Advanced CP/ETB: Digital Worlds: Making and Performing in Digital Contexts
Intermittent: 10 units
In this class students will look at digital spaces including social media, chatrooms, online galleries, phone applications, YouTube, 3D renderings, massively multi player online games, and more to produce works that respond to the specificity of these terrains. There is a rich history of site specificity and contextual practice in the physical world; this class will consider parallels in computer-based environments. In addition to theory and research components, students will develop a variety of technological skills in video production, webcasting, audio editing, gif animation, 3D modeling, and more in this course. Prerequisite: 60-110

60-430 Advanced SIS: Open Sculpture
Intermittent: 10 units
Open Sculpture is a project-based studio that allows for student-driven development of an artistic practice in sculpture, installation, and systems. Ours is a widely inclusive and experimental definition of "sculpture," encouraging interdisciplinary approaches. Artists will create 2 to 3 major projects and home in on individual sense of creative identity through the development of personal research interests, aesthetic sensibilities, and their own critical language surrounding common themes through their projects. An emphasis will be placed on extremely contemporary art and digital documentation / interaction, in acknowledgement of our hybrid digital-physical learning circumstances.

60-431 Advanced SIS: Installation
Intermittent: 10 units
This course explores a broad range of sculptural issues concerning the practice of Installation Art. This Studio course will primarily emphasize inclusive environments (but not necessarily), given the circumstances of remote learning and one's bedroom as studio, or a similar venue, small and intimate may be more appropriate. Students expected to involve an ensemble of elements: objects, (found, purchased, reused, appropriated), made from an array of any kind of materials including natural materials; combined with time-based, digital sense of creative identity through the development of personal research interests, aesthetic sensibilities, and their own critical language surrounding common themes through their projects. This course will ask students to create projects that explore the use of clay as a medium in the context of their own work. It is intended for students who would like to specialize in clay sculpture, as well as students who work primarily in other mediums. Projects will originate from self-generated ideas. Class time will stress group participation and broaden viewpoints and sharpen critical abilities. The majority of class time will be for studio projects. The use of mixed media is allowed. A materials fee is required.

60-433 Advanced SIS: Why Not Mud - Clay Sculpture
Intermittent: 10 units
Clay is a primary building block of sculpture. This supple, responsive and versatile material is being incorporated into the work of many contemporary artists today. This class will ask students to create projects that explore the use of clay as a medium in the context of their own work. It is intended for students who would like to specialize in clay sculpture, as well as students who work primarily in other mediums. Projects will originate from self-generated ideas. Class time will stress group participation and broaden viewpoints and sharpen critical abilities. The majority of class time will be for studio projects. The use of mixed media is allowed. A materials fee is required.

60-435 SIS: Metals
Intermittent: 10 units
Studio focus on fabrication using light metalworking techniques including forming, joining, and finishing. Metalsmithing and jewelry techniques will be explored in the context of sculptural issues. Metal stretching, forging, brazing, texturing, small scale casting and coloring are also presented. Slides looking at small scale metalwork, as well contemporary sculpture using metal techniques will be presented periodically. Metals provided include copper, brass, and bronze sheet and wire. Materials fee will also cover silver solder and other expendables. This is a repeatable class that will add to the tools and techniques acquired in earlier metals classes while expanding individual growth within the concept and context of sculpture.

60-437 Advanced CP/SIS: Environmental Sculpture
Intermittent: 10 units
Studio focus on sculpting with the environment. Includes object making, installations and site work with an emphasis on ecological themes: eco-material use and reuse, growing systems, environmental impact and a variety of other related issues. The semester is structured with initial exercises and a series of small gestures that lead to a major project. Students are required to explore and to develop proposal making skills in order to implement a site-specific project; either real or virtual. Students to produce a project complete with a well-documented outcome to include: visual representation, research and written descriptions.

60-438 Advanced SIS: Intimate Objects
Intermittent: 10 units
The intimate object - exploring the issues of small scale sculpture. This class will deal with the creation of objects that require a one on one interaction with the viewer. Unlike much heroically scaled sculpture, there is a distinctly personal and intimate connection that these objects engender. The class will look at historical examples, as well as 20th century works starting with the dada and surrealists. Problems of small scale sculpture will include topics such as the miniature versus actual size, the nature of materials, the issue of craftsmanship, the problem of preciousness. This class is open to advanced sculpture students working in any media.

60-440 Advanced SIS: Sculpture After the Internet
Intermittent: 10 units
Hito Steyerl asked, "Is the internet dead? ...[it is] completely surveilled, monopolized, and sanitized by common sense, copyright, control, and conformism... what happened to the internet after it stopped being a possibility?" This course assumes it is the artist's role to find and create possibilities in all contexts, and investigates what it means to create new possibilities by making physical objects, experiences, sculptures, installations, and systems in an era post-internet. As a project-based experimental lab, this class asks students to navigate back and forth between digital and physical creative tool sets to create new works. We will take inspiration from the history, theory, ideologies and technologies surrounding the internet, as well as from artists, animators, and engineers working on and around the internet today. We will explore issues surrounding automation, digital fabrication, and online maker / fabricator culture as tools to be used, but also as socio-political forces. Other concepts we will explore as a group include the relationship between body and technology; cybernetics, robotics, AI, and the uncanny valley; the relevancy of hand-making and physical construction post-automation; "image-objects;" scripted spaces; the producer-consumer continuum; the divisiveness and productiveness of online subcultures; anonymity; accessibility of information and production tools; and the spatial and temporal effects of inhabiting both digital and physical worlds. If we understand our current epoch as an era dominated by onscreen and networked experiences, this course investigates what it means to embrace, explore, explode, celebrate, negate, critique, reverse, or oppose that the making of sculpture, broadly defined. This course assumes knowledge of at least very basic 3d modeling, and/or physical computing, and/or coding, and/or 3d media fabrication/construction techniques. Prerequisites: 60-212 or 60-134 or 60-133 or 60-132 or 60-131 or 60-130 or 60-210
60-446 Advanced SIS: Expanded Theater Fusion Studio
Intermittent: 10 units
[IdaTe collaborative course] As the boundaries between theater, art, entertainment and everyday life continue to expand through engagement with new technologies, it is critical that emerging artists and technologists be provided with the tools, language, and vision to thrive in the new millennium. Expanded Theater will reanimate classical modes of performance with media, networks, robotics, locative applications, and mobile systems. Considering theater as an ancient technology of mass participation and social cohesion, this fusion studio explores how emerging technologies can expand upon the basic theatrical relationships in new and culturally relevant ways. Collaboration and integration of design, media and storytelling is critical to this approach. Experimentation with new forms can reanimate the basic values of theater; the essential nature of a live event, the possibility of visionary spectacle, and the creation of meaning in dialogue with an audience. Expanded Theater is an opportunity to explore avenues outside of traditional theatrical production modes and beyond each student's individual discipline. The curriculum combines resources from Carnegie Mellon's Schools of Art and Drama, Integrative Design, Arts, and Technology (IdaTe), the Emerging Media Masters (EM2), Computer Science, the Robotics Institute, and their collaborators across the university in a new configuration. Expanded Theater will explore domains ranging from site specific and networked-based performance and interventionist practices, to pervasive social media technologies and their influence on interpersonal communication. The goal is to investigate contemporary languages that allow authors, actors and technologists to collaborate in ways that push beyond our present understanding of theatrical production and reception. This course alternates between two modes of research and design.

60-447 Advanced CP: Art at the End of the World
Intermittent: 10 units
The world is awash today in stories that anticipate an end to the world as we know it. These daunting narratives often anticipate techno-apocalypse, global pandemics, runaway climate change and mass extinctions. Their scale can appear to dwarf the actions of individual humans, and yet this is exactly where the work of the artist is proportionally most significant. Artists write the myths that help us understand the present, and create the monuments that explain the present to the future. They sound the alarm anew when sympathetic ears have grown deaf, and most importantly, they invent hopeful futures that were previously beyond imagination. Students in this course will learn significant historical and contemporary "end times" narratives, both utopian and dystopian, as well as the cultural responses to them. We will be using these as launching points for creatively engaging with our present apocalyptic predicaments. Students will visit regional locations that provide real-world grounding for these stories. They will use joy, Invention, humor, and courage, to create works using the full range of artistic expression from the highly ephemeral to the timeless. This course may never be offered again.

60-450 Advanced DP3: Drawing
Intermittent: 10 units
Hypothetically, a drawing remains outside of time. A drawing is an indestructible desire, an instant caught, a thought preserved. A drawing's beginning, middle and end are depicted simultaneously. To the extent that we fancy ourselves as one with knowledge, opinion and appraisal at our fingertips there is NO TIME more appropriate for drawing. In this studio course we will research, examine and create works relative to three thematic units: the spontaneous (Immediate, performative, transformative magic touch); the archetypal (formal aspects not bounded by time); and the eternal (formal aspects not bound by time). Students will experiment with materials and techniques, and develop their own imagery, content and processes. Prerequisites: 60-157 or 60-150

60-451 Advanced DP3: Concepts of Figuration
Intermittent: 10 units
This course encourages creative exploration of the human image beyond observational figure drawing. We will be thinking of the figure as a symbol to explore narrative, anthropological, cultural, sociopolitical, gender, and dream-life imaging. Through these lenses the figure becomes primary to the understanding of personal or group identity, place, sexuality and gender identification. Figure drawing is open to the use of traditional and extreme image making methods including observational and fictional representations or other conceptual premises relevant to the successful presentation of portfolio held concerns. Emphasis will be placed on the student's expressive use of the material and image. The class will consist of studio time, critique, readings, and discussion.

60-452 Advanced DP3: Color
Intermittent: 10 units
In this advanced course, students will learn to employ a wide range of color theories and color systems through hands-on exercises and studies. Studies will be done primarily in paint, with some use of collage and digital media. These exercises will be aimed at mastering a variety of color approaches that will be applicable to each student's own artistic practice. Students will develop, based on their own interests, a cohesive body of work in which to practice and expand on the skills learned through the directed exercises. Studio work will be augmented by lectures, demonstrations, critiques, readings and critical discussion of writings about color. Prerequisites: 60-160 or 60-157 or 60-150

Course Website: https://sites.google.com/andrew.cmu.edu/colorfall2020/claytonmerrell/home (https://sites.google.com/andrew.cmu.edu/colorfall2020/claytonmerrell/home)

60-453 Advanced DP3: Painting
Fall and Spring: 10 units
This course is designed to help promote a painter's development, both conceptually and technically. It encourages students to expand their ideas through a diverse set of projects. Through research and studio experimentation, students will explore issues of scale, surface, materiality, process and performativity in painting. They will also consider notions of the "picturesque" and how non-artistic disciplines can inform painting. Lectures and assignments are designed to enrich the painter's conceptual and technical base and to promote creative growth. Prerequisite: 60-250

60-460 Advanced DP3: Paint/Print
Intermittent: 10 units
Paint/Print encourages creative exploration of the boundaries where print media and painting through material investigation, thereby eliminating any assumed hierarchy between the two modes of working. Painting and printmaking are open to the use of traditional and extreme image making methods including observational and fictional representations, abstraction, collage, installation, digital drawing/painting or other conceptual premises relevant to the successful presentation of privately held concerns in image-making. Emphasis will be on experimentation with both material and image. The class will consist of studio time, critique, readings, and discussion. Prerequisites: 60-250 and 60-251

60-461 Advanced ETB: Experimental Capture
Intermittent: 12 units
This is an interdisciplinary course in experimental media practices that arise from using devices to "capture" the world. We will survey state-of-the-art techniques and emerging ideas, to record objects, people, places and events in ways that go beyond the limits of human perception. The course evaluation will be project-based, in which students will capture a wide variety of things, and develop projects around the data they collect. We will cover a wide range of unusual devices and techniques for acquiring information about the world, including panoramic and hyperspectral imagers, depth sensors, 3D scanners, photogrammetry, motion capture systems, face-trackers, hand-trackers and eye-trackers, binaural and ultrasonic audio, and more. Through these explorations, we seek the visual cues of exotic, forgotten and nascent image capture technologies. Prerequisite: 60-250

60-462 Advanced ETB: Experimental Capture
Intermittent: 12 units
This course will be a hands-on investigation of the material, tangible, and physical aspects of painting. Students will learn how to make and use various paints, supports and grounds including oil paint, egg tempera, encaustic, watercolor/gouache, distemper, casein and fresco (in addition to other materials based on student interest). The working properties of various additives to and combinations of these media will be examined and experimented with. Technical issues affecting longevity will be addressed and experimentation will be encouraged. Students will investigate the work of other artists with a forensic "How did they do that?" approach. The second half of the semester will be devoted to studio work focusing on the ways in which each student's personal vision can be embodied and expanded in one or more of the above media. Prerequisites: 60-150 and 60-250
60-464 Advanced DP3: Expanding the Graphic Novel
Intermittent: 10 units
In this course, students will critically and creatively engage with the medium of comics to learn how to better communicate their ideas in this format as well as challenge its boundaries. A substantial portion of the course will focus on familiarizing students with the basics of storytelling in a sequential narrative format and creating opportunities for students to discover, hone and explore their own voice and style. In addition to creating new work, students will also explore the history of comics and the origins of the "modern" graphic novel. Students will also be exposed to both graphic and non-graphic artists whose works has challenged and redefined the genre. We will explore these artists in order to understand how our own work borrows from and draws upon a rich lineage. Students will also be expected to think beyond the commonly accepted notions of comics and to question the relevancy of their work in this medium. Finally, each student will produce a new body of work that will culminate in the production of a 4-5 "page" "sequential" narrative.

60-466 Advanced DP3: Publishing as Artistic Practice (In Quarantine)
Intermittent: 10 units
This course will look at the history of artist multiples from artist books and zines, mail and subscription based practices, and editioned objects. Students will be introduced to techniques in traditional bookbinding, zine making as well as design and layout an artist book for mass publication. Studio work will focus on materials and processes that can be found and done at home as well as designing projects that utilize print-on-demand product services. We will be looking at contemporary artist's multiples that exist over a wide range of media, from fine art prints, sculptural and digital editions, and even performance and participatory work conceptualized as a multiple. We will discuss the economy and business structure behind independent publishing, looking into contemporary artists who are running their own presses, an emergence of art book and zine fairs, and envisioning alternative distribution opportunities for our artworks.

60-468 Advanced DP3: Print Media
Intermittent: 10 units
This fast-paced Advanced Print Media class begins with collecting out-of-print ephemera as the source inspiration for creating new images, using any technical process or conceptual strategy from the Print Media toolbox. This is a high output, low stakes class that emphasizes Making and Doing as the key foundation for a generative creative practice. This class will include visits to used bookstores and library special collections for source images and hands-on workshops at local print studios and letterpress shops. Students will have access to Screenprint, relief, intaglio, lithography, scanners, large format digital printing on both paper and textile, xerox, risograph, laser/cnc aided print matrices etc. Students will explore alternative methods (portfolio exchanges, zines, artist books, gifs, instagram, tumblr) of the graphic image to recirculate images and texts that were out-of-print. Prerequisite: 60-251

60-471 Advanced DP3: Photography/Print Workshop
Intermittent: 10 units
In this course in Photography and Print, students will develop semester-long individual projects. Contemporary photographic artists' books and/or multiples. Students will work in photography and/or print media, with an invitation to use either studio-based processes (intaglio, lithography, screenprint, photography lab) or work with hand-printing, digital or nontraditional approaches (monotype, stamps, stencils, rubbings, relief, digital photography). This will culminate in a capstone book, supported by the School of Art. Readings, discussion, critique, and visiting artists will enhance our conversation and research. As a workshop, this course is for students who are ready to explore their work more deeply and create ambitious self-driven projects.

60-472 Advanced DP3: Mutable Landscape
Intermittent: 10 units
With camera in hand, students will explore, document and invent a sense of place in Pittsburgh. Informed by photographic history and landscape studies, students will develop their own portfolios of digital prints. As a CPA interdisciplinary photography course, students will be encouraged to consider their photographs in the medium of their home department, and in some cases as a starting point for projects in other materials. No prerequisites.

60-474 Advanced DP3: Imaging Liveness: photography and performance
Intermittent: 10 units
Performance art, or the live event, has been a continuous element of art practice throughout most of the 20th century but our evolving technologies of digital recording devices have radically impacted our understanding of performance as a medium of disappearance. With the increased expectation to engage remotely the role of documentation in relationship to the live event has become an inevitability rather than a conscious construction. We are expected to be both a warm flesh body and simultaneously our own image. Considering the proliferation of cameras, the value of photographic representation, its meaning and potential are critical - from within the glut of image culture it becomes crucial to re-examine our corporeal existence and the repercussions of both having a body and being represented as a body. We will discuss the writing of Peggy Phelan, Andre Lepecki, Fred Moten, Philip Auslander, and Lynne Tillman to deepen our understanding of various historical genres of image construction as they relate to performance and notions of liveness. In this course you will have the opportunity to develop live performances and consider how its documentation can be a transformation of the live event into a work unto itself. We will work collaboratively during in-class workshops; exploring the physical and social aspects of photographic processes in the development of unique event-based photographic methods. Participation in this course will grant you access to a professional digital SLR camera, lens kit, and tripod for the duration of the semester. This course will offer you the time and space to produce new work; take part in advanced critique and research current issues surrounding contemporary photography and performance as they pertain to your individual work. The course will culminate in the production of a printed catalog of student work.

60-475 Advanced DP3: Open Print
Intermittent: 10 units
This advanced Print Media course focuses on student-driven development of a studio practice focused on contemporary print, multiples and distributed art. In this class, individuals will continue to build on technical skills and concepts, and the interdisciplinary applications of both, through self-directed, individual approaches. This course is for advanced students of art, ready to focus on larger-scaled, conceptually and formally ambitious projects that are formed from long-term investigations. Prerequisites: 60-475 or 60-468 or 60-473 or 60-474 or 60-476

60-476 Advanced DP3: Serigraphy (Screenprinting)
Intermittent: 10 units
This course is on artistic work on paper, but will also be exposed to the ways that screenprint can work across a wide range of different media: from 2D (paper, canvas, cloth) to 3D (book forms, sculpture, installations) and utilizing printed multiples in participatory and exchange based artworks.

60-478 Advanced DP3: Photography Stands Up
Intermittent: 10 units
This advanced 10 unit course focuses on non-traditional photography, digital, alternative and experimental approaches that go beyond the typical photography class. The emphasis of this course is on artistic work on paper, but will also be exposed to the ways that screenprint can work across a wide range of different media: from 2D (paper, canvas, cloth) to 3D (book forms, sculpture, installations) and utilizing printed multiples in participatory and exchange based artworks.
60-486 The Art and Science of Color
Intermittent: 10 units
This interdisciplinary course will consist of a combination of chemistry lecture and labs with studio art and art history. The focus of the course will be on the intersection of painting practice with chemistry, particularly in the study of pigments of mineral and inorganic origin. This is a project course open to majors in chemistry and art. The course and its projects are designed to expand the expertise of students in each discipline, while exposing them to the methods, demands, and aims of the other. Historically, the craft of painting was closely linked to the practice of pigment manufacture, with painters procuring their materials in raw form directly from the chemist/apothecary, and often performing themselves the first modifications and grinding of the minerals into pigments. Color has been used by both artists and alchemists as a benchmark for tracking changes while creating new materials based on minerals found in nature. With the advent of mass-produced and marketed art materials in the nineteenth century, the distance between chemist and artist increased until the two worlds have little to do with one another. This class aims to reconnect the two disciplines for a study of their common ground. Students will learn about the origin of the color of minerals with primary focus on colors that originate from electronic transitions and will work collaboratively on hands-on laboratory research projects that involve the synthesis, characterization, and use of inorganic pigments. In the studio, they will make their own egg-tempera paints, and use them in painting projects designed to increase color skills as they learn about the history of pigment use. Students will collaboratively design and carry out final projects which combine research, experimentation and creative work. A series of researchers who work at the boundary between art and chemistry will give guest lectures, and the class will make field trips to local research labs and museums.

60-487 Advanced CP: The Amateur
Intermittent: 10 units
If a contemporary artist can truly do and be anything, how come so much art looks the same? More and more contemporary artists are pushing beyond the conventional media and methods of the art world by strategically operating as "professional" amateurs. The term amateur reflects a voluntary motivation to create as a result of personal passion for a particular activity, regardless of expertise or authority. For the artist, embracing the role of the amateur allows for the use of any profession, institution, or social activity as a possible material within their creative practice. This includes artists who "perform" as amateur preachers, psychologists, geneticists, politicians, and exotic dancers; artists who create amateur institutions like sanitariums, circuses, hair salons, talk shows, and planetariums; and artists who collaborate with professional hypnotists, ornithologists, stunt coordinators, ventriloquists, and diplomats in order to manifest their work. Students in this class will work on self-defined projects that utilize the role of the amateur as a critical method for expanding the breadth and reach of their art practice into new forms and venues. With faculty mentorship, each student will be responsible for developing their projects through independent research, apprenticeships, and collaborations with experts in fields relevant to their work. Workshops, lectures, and in class critique of ongoing work will look at contemporary trends related to amateurism in art practice, theory, and the world at large. This class is not about being an amateur artist, but about being a serious artist who uses amateurism as a tool. Thus the class is only open to students with ???

60-490 Advanced CP: Art of Mapping/Mapping as Art
All Semesters: 10 units
Many artists have used maps as inspiration, and for some, maps are integral to their work. Maps purport to objectively represent territory while revealing the biases of their authors. This course will question conventional notions of objective cartography and look at how artists have creatively and critically used various forms of mapping. As well as geographical and physical space, the course will consider representations of psychological space, social space and conceptual space. Definitions of mapping will be extended to include information visualization, diagrammatic systems, geographic infrastructures, aerial photography, landscape interventions, and journeys through space and time. Following a few initial short assignments, students will devise their own projects later in the semester.

60-491 Advanced CP/ETB: Art AFTER The End Of The World
All Semesters: 10 units
Taught by Prof. Rich Pell (School of Art BSA Faculty Advisor and founder of the Center for PostNatural History). This course will take students on a deep dive into our mythological, scientific and artistic understanding of world-changing catastrophic events, from the earliest human stories up to the present moment. Film and writings, fiction and non-fiction will inform a critical conversation about the important role of artists in these times. Contemporary research in science and critical theory will inform the development of unique self-defined creative practices that embrace our most durable human qualities of joy, empathy, humor, and courage. Field-trips (virtual and/or RL) will fuel group discussion and the development of new artistic works open to any media.