INTERACTIVE TELECOMMUNICATIONS PROGRAM

FALL 2016

COURSE DESCRIPTIONS

TIER 1 - FOUNDATION COURSES

**Comm Lab: Animation**

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<tr>
<th>Course Code</th>
<th>Time</th>
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<tr>
<td>ITPG-GT.2002.1</td>
<td>Thurs 3:20pm to 5:50pm</td>
<td>Gabe Barcia-Colombo</td>
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<tr>
<td>ITPG-GT.2002.2</td>
<td>Tues 12:10pm to 2:40pm</td>
<td>Gabe Barcia-Colombo</td>
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<tr>
<td>ITPG-GT.2002.3</td>
<td>Wed 6:30pm to 9:00pm</td>
<td>Gabe Barcia-Colombo</td>
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This course explores the fundamentals of storytelling through animation. Students will create two short animation pieces over the course of seven weeks. The first part of the course is devoted to the stop motion sing Dragon Stop Motion. The second part of the course is devoted to digital collage animation using After Effects. Drawing skills are not necessary for this class, however, you will keep a sketchbook. Basic video and sound skills are required.

*This two-credit course will meet the last seven weeks of the semester.*

**Syllabus**

**Comm Lab: Video and Sound**

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<th>Course Code</th>
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<tr>
<td>ITPG-GT.2001.1</td>
<td>Tues 12:10pm to 2:40pm</td>
<td>Marina Zurkow</td>
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<tr>
<td>ITPG-GT.2001.2</td>
<td>Thurs 3:20pm to 5:50pm</td>
<td>Marina Zurkow</td>
</tr>
<tr>
<td>ITPG-GT.2001.3</td>
<td>Mon 6:30pm to 9:00pm</td>
<td>Sharon De La Cruz</td>
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<tr>
<td>ITPG-GT.2001.4</td>
<td>Thurs 6:30pm to 9:00pm</td>
<td>Sharon De La Cruz</td>
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This course explores the fundamentals of sound and video. Students will learn the basics of both audio and video recording using audio field recorders and a variety of cameras as well as editing and exporting in Adobe Premiere. Students will work in teams to produce both an audio soundscape and a three-minute video short. This 2-credit course meets for the first seven weeks of the semester.

*This two-credit course meets for the first seven weeks of the semester.*

**Syllabus**

**Comm Lab: Visual Language**

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<tr>
<td>ITPG-GT.2005.1</td>
<td>Wed 12:10pm to 2:40pm</td>
<td>Katherine Dillon</td>
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<tr>
<td>ITPG-GT.2005.2</td>
<td>Mon 12:10pm to 3:05pm</td>
<td>Nancy Nowacek</td>
</tr>
<tr>
<td>ITPG-GT.2005.3</td>
<td>Thur 12:10pm to 2:40pm</td>
<td>Katherine Dillon</td>
</tr>
<tr>
<td>ITPG-GT.2005.4</td>
<td>Mon 3:20pm to 6:15pm</td>
<td>Nancy Nowacek</td>
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The goal of this course is to provide students who are new to the principles of visual design with the practical knowledge, critical skills and confidence to effectively express their ideas in a visually pleasing and effective way. Over the course of 7-weeks an overview of the many tools and techniques available to convey an idea, communicate a message and influence an experience will be presented, discussed and applied. Topics covered in the course include: typography, color, composition, branding, logo and information design. This class is intended for students who do not have formal graphic design or visual arts training but recognize the powerful impact of visual decisions in their work.

**COURSE OUTLINE**

Class 1 – Principles of Visual Communication
Class 2 – Signage and Information Systems
Class 3 – Typography/Composition
Class 4 – Logo and Brand Design
Class 5 – Color Theory
Class 6 – Information Design

Each meeting a new topic will be presented. The format will be a class discussion with a focus on examples of the theme for the week. Each topic will have a related assignment that will be done by each student individually and presented and critiqued in the following class. For students new to or with limited skills in Photoshop or Adobe Illustrator there will be a series of informal weekly workshops led by residents to teach the basics and answer questions on use of the software. Completion of the assignments and participation in the class discussion is required. Students must maintain a blog where they post their assignments.

*This two-credit course will meet for the first seven weeks of the semester.*

**Syllabus**

**Applications**

(4 Points) ITPG-GT.2000.1 Tues 3:20pm to 5:50pm Nancy Hechinger

This introductory class is designed to allow students to engage in a critical dialogue with leaders drawn from the artistic, non-profit and commercial sectors of the new media field, and to learn the value of collaborative projects by undertaking group presentations in response to issues raised by the guest speakers. Interactive media projects and approaches to the design of new media applications are presented weekly; students are thus exposed to both commercial as well as mission-driven applications by the actual designers and creators of these innovative and experimental projects. By way of this process, all first year students, for the first and only time in their ITP experience, are together in one room at one time, and as a community, encounter, and respond to, the challenges posed by the invited guests. The course at once provides an overview of current developments in this emerging field, and asks students to consider many questions about the state of the art. For example, with the new technologies and applications making their way into almost every phase of the economy and rooting themselves in our day to day lives, what can we learn from both the failures and successes? What are the impacts on our society? What is ubiquitous computing, embedded computing, physical computing? How is cyberspace merging with physical space? Class participation, group presentations, and a final paper are required.
This course meets at Cantor Film Center (36 E. 8th Street).

Introduction to Computational Media

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<tr>
<td>ITPG-GT.2233.1</td>
<td>Thur 09:00am to 11:30am</td>
<td>Daniel Shiffman</td>
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<tr>
<td>ITPG-GT.2233.2</td>
<td>Thur 12:10pm to 2:40pm</td>
<td>Allison Parrish</td>
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<tr>
<td>ITPG-GT.2233.3</td>
<td>Thur 12:10pm to 2:40pm</td>
<td>Shawn Van Every</td>
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<td>ITPG-GT.2233.4</td>
<td>Thur 3:20pm to 5:50pm</td>
<td>Allison Parrish</td>
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<td>ITPG-GT.2233.5</td>
<td>Thur 3:20pm to 5:50pm</td>
<td>Daniel O'Sullivan</td>
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<tr>
<td>ITPG-GT.2233.6</td>
<td>Thur 3:20pm to 5:50pm</td>
<td>Daniel Shiffman</td>
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<tr>
<td>ITPG-GT.2233.7</td>
<td>Tues 12:10pm to 2:40pm</td>
<td>Mimi Yin</td>
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What can computation add to human communication? Creating computer applications, instead of just using them, will give you a deeper understanding of the essential possibilities of computation. The course focuses on the fundamentals of programming the computer (variables, conditionals, iteration, functions, and objects) and then touches on some more advanced techniques such as data parsing, interfacing with hardware, mobile development, and HTML5/DOM. The JavaScript-based 'p5.js' programming framework is the primary vehicle for the class. All sections assume no programming experience at all. The end of the semester is spent developing an idea for a final project and implementing it using computer programming. (Programming (Pure), Foundation)

Syllabus

Introduction to Physical Computing

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<td>ITPG-GT.2301.1</td>
<td>Wed 3:20pm to 5:50pm</td>
<td>Thomas Igoe</td>
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<tr>
<td>ITPG-GT.2301.2</td>
<td>Wed 09:00am to 11:30am</td>
<td>Thomas Igoe</td>
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<tr>
<td>ITPG-GT.2301.3</td>
<td>Wed 09:00am to 11:30am</td>
<td>Daniel Rozin</td>
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<tr>
<td>ITPG-GT.2301.4</td>
<td>Wed 12:10pm to 2:40pm</td>
<td>Jeffrey Feddersen</td>
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<tr>
<td>ITPG-GT.2301.5</td>
<td>Wed 12:10pm to 2:40pm</td>
<td>Benedetta Piantella</td>
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<tr>
<td>ITPG-GT.2301.6</td>
<td>Thur 12:10pm to 2:40pm</td>
<td>Benedetta Piantella</td>
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<td>ITPG-GT.2301.7</td>
<td>Wed 3:20pm to 5:50pm</td>
<td>Daniel Rozin</td>
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This course expands the students' palette for physical interaction design with computational media. We look away from the limitations of the mouse, keyboard and monitor interface of today's computers, and start instead with the expressive capabilities of the human body. We consider uses of the computer for more than just information retrieval and processing, and at locations other than the home or the office. The platform for the class is a microcontroller, a single-chip computer that can fit in your hand. The core technical concepts include digital, analog and serial input and output. Core interaction design concepts include user observation, affordances, and converting physical action into digital information. Students have weekly lab exercises to build skills with the microcontroller and related tools, and longer assignments in which they apply the principles from weekly labs in creative applications. Both individual work and group work is required.

Syllabus
**Designing Healthcare**

(I Point) ITPG-GT.2013.1  Sat 12:00pm to 6:00pm  Chris Andrew Anthony

What does it mean to design for individual patients or healthcare systems? What are common problems patients encounter as they traverse the healthcare system and what unique solutions and creative inspirations can we propose? In Designing Healthcare students will experience 4 patient case scenarios that intimately illustrate patient disease onset, initial interaction with the healthcare system, hospital stay, surgical encounters and post operative or post treatment course. Each patient case presentation will be followed by discussion of observations and identification of inspirations, problems and design opportunities. Students will then identify a single design they would like to execute as their final project. This class will take place on two Saturdays spaced 1 month apart. Final project options will be broad and might manifest as code, an interface or medical device prototype, hacking the interior design of a healthcare space, a systems design proposal or art inspired by a patient case.

*This one-credit course meets on 2 Saturdays, September 24 from 12 noon to 6 p.m. and Saturday, October 29 from 12 noon to 2:45 p.m.*

Syllabus

**Lighting Without the Board**

(I Point) ITPG-GT.2016.1  See dates below  Monty Taylor

This course builds upon ITP’s expertise of lighting LED’s to explore how we can make artistic choices for both how to light an event, our own work, or even make lighting based sculptures. Traditionally this work was limited to those with access to large DMX boards; however, we will look at how to use the DMX protocol to power large scale lighting rigs with either code or open source software that emulates the traditional board approach. We will also explore the artistic side of lighting to enable you to make more creative choices about angle, color, and which instruments to use.

Assignments will include:

- Lighting a still moment
- Exercises in how to enhance a narrative with lighting
- Lighting a small event
- A final project: Applying all of the skills from the course

*This one-credit course meets on Saturday, November 19 from 12 noon to 6 p.m. and Sunday, November 20 from 12 noon to 2:45 p.m.*

**Mapping Systemic Relationships**
Systems thinking is relational thinking, and the best way to understand systemic relationships is to map them out. In this class we will develop, discuss, and compare a range of mapping (i.e., diagramming) methods and models. Key methods include concept mapping, issue mapping, influence mapping, analog mapping, and boundary critique; key models include systems archetypes, the regime shift model, and the logic model / action research cycle model. We will use these methods and models to examine social and environmental issues, and the resulting maps will inform our conversations as we consider and critique strategies for effective engagement. No explicit familiarity with systems thinking is required; this class will serve as both introduction for newcomers and augmentation for old hands.

What will students do?

Students will work in small groups to apply mapping techniques to case studies (provided as text, audio, video) of social and environmental issues. These mappings will challenge students to articulate and clarify both their understandings of complex situations and their hypotheses about affecting change in areas of concern or opportunity. Throughout the course, hands-on exercises will be woven together with introductions to relevant systems theory and discussions of mapping insights.

This is not a class in art, design, engineering, or business techniques, per se. Rather it is a class in systems thinking approaches that can inform how the artist, designer, engineer, or businessperson understands and engages in the world.

How will the course be structured?

Preparation

Become familiar with 3-5 case studies, as well as other introductory materials, which instructor will provide (as text, audio, or video) one month prior to the class.

Day One:
 Develop mapping techniques for examining these case studies and/or ones with which students are already familiar.

End of day one / overnight assignment:
 In small groups, continue to discuss and work on a selected mapping project.

Day Two:
 Project presentations and critiques
 Workshop summary, discussion, and reflection

Evaluation:
 Based on individual participation throughout the two-day workshop

This one-credit course meets on Saturday, November 5 from 12 noon to 6 p.m. and Sunday, November 6 from 12 noon to 2:45 p.m.
Actual Fact: Visualizing Hiphop Lyrics As Cultural Indicator

(2 Points) ITPG-GT.2017.1  Wed 3:20pm to 5:50pm  Tahir Hemphill

While the last decade can be characterized by collecting and publishing information, this decade has been focused on engaging with, editing and understanding the current torrent of available information. But in order to tell a story, data needs memory – allowing it to then be anchored with first hand experience. Working collaboratively—students will create projects that pair data visualization with critical scholarship, investigating the relationships between Hiphop data and society.

Actual Fact responds to global changes in science, technology, society, history and culture by transforming information into final projects that viewers can relate to and interact with. As a result, Actual Fact addresses the cultural implications of society’s current focus on big data, and cautions against obscuring narratives of Hiphop through the “objective” use of data. Visualizing Hiphop’s data allows us to listen to Hiphop in a new way; this new way of listening produces new ways of understanding Hiphop culture and in turn, new ways of understanding ourselves.

This two credit course will meet the last seven weeks of the semester.

Alt Docs: Inventing new formats for non-fiction storytelling

(2 Points) ITPG-GT.2018.1  Wed 6:30pm to 9:00pm  Ziv Schneider / Julia Irwin

How does the ability to capture and publish transmedia pieces lend itself to documentary storytelling and journalism? How are traditional genres enriched by the addition of new-media techniques, including 360 film, photogrammetry, depth sensing and spatialized audio? And how can the use of these techniques help to evolve the definition of nonfiction storytelling?

This is a production class in which the projects will be content-driven. The subject and the story should drive the students’ choice in media formats used to present the material. The interplay between different mediums should add to the experience of the story. A successful final project will be a piece in which the story is better told through the incorporation of the mediums chosen over a traditional cinematic documentary or journalistic piece.

The goal of the class is to investigate the merging and branching of documentary, journalism and games and to invent new formats. The class focuses on two main technical areas:

1. Capture techniques (including 360 video, photogrammetry and depth sensing)
2. Composition of material in a 3D environment (Unity 3D, adding interactivity, interface design, publishing platform considerations)

The first two short assignments will cover different capture methods and documentary techniques.

The final project will focus on creating one interactive documentary piece in a digital 3D environment composed with Unity. However, the digital element can be accompanied by other components (immersive installation, sculpture, performance, web experiment, public intervention, etc.).
This two credit course will meet the last seven weeks of the semester.

Syllabus

Crafting Mindful Experience

(2 Points) ITPG-GT.2627.1    Mon 6:30pm to 9:25pm    Frederick Muench

Over the last 10 years our sustained attention and gratitude have decreased while perceived stress, social and material comparison and entitlement have increased. There have been numerous attempts to build technologies that enhance our mindful awareness and wellbeing but few have gained the traction expected based on the scope of the problem. The goals of this course are to understand underpinnings of stress and wellbeing, methods used to improve wellbeing, and ingredients of affective computing systems and behavior change paradigms. Based on this foundation, we will perform in-depth reviews of existing services, products and applications, practice various forms of meditation, and you will design systems that foster positive experiences, mindful awareness, meditative and embodied states, physiological balance, etc. The projects you develop will be based on your personal goals and needs and you can use any medium of delivery (e.g. device, application, video, performance). The emphasis in this class is on theory and creatively tackling new methods to foster a higher state of internal harmony and wellbeing.

This two credit course will meet the last six weeks of the semester.

Designing for Seniors in the Information Age

(2 Points) ITPG-GT.2743.1    Wed 09:00am to 11:30am    Julian Boxenbaum

Design is a field which occupies itself with the hypothetical questions of ‘what if?’ and ‘what could be?’ In any design process we are presented with dozens or hundreds of questions along the way. Like in a geometric proof, each decision we make will have an effect on subsequent questions and answers. How and why we make these decisions will determine whether a design will succeed or fail.

This course will teach research, analytical, and design techniques which will help designers identify critical opportunities and make informed and defensible design decisions which will stand up to the scrutiny of clients and resonate with end users.

We will focus on identifying opportunities to create physical and technological design solutions which will help seniors and Baby Boomers remain relevant and integrated in mainstream society and extend the quality of their lives.

Consider that there are over 80 million Boomers in the US controlling over one trillion dollars in assets (80%+ of the US total). The oldest Boomers are now only 73 years old but, as a group, they have already come to dominate the medical device market. Still, most products and brands are geared for Traditionals (the previous generation) whose cultural priorities and values differ significantly from the ‘consumer culture’ oriented and tech aware Boomers.
"Through direct research and analysis, we will identify latent opportunities for disruptive design solutions, both physical and technological which will help preserve and extend societal engagement and the quality of life for the target demographic. Students will conduct various forms of field research working with individuals and organizations in our target demographic to test their assumptions and hone their solutions. They will then build prototypes which can be tested by the targeted end user. Possible organizations will include; AARP, Senior Planet, Aging 2.0, OATS (Older Adults Technology Services) "The course will require a significant amount of field research and iterative studio work. It will include:

- Research: Qualitative and quantitative methodologies for collecting target information, problem identification and analysis. 'Design Research Methods and Perspectives' edited by Brenda Laurel will be used as a guide.

- Interactive Exploration: Ideation, sketching, sketch modeling (on computer and real life), 3D analysis, testing for feedback

- Design Development: Choosing direction, honing supporting material (research) into compelling case, prioritizing problems to address in designs, human factors, usability, refining drawings, models, detailing, materials, colors, finishes, etc.

- Presentation: deliverables may include; digital graphic presentation, renderings, research, drawings, scale model/prototype, video, process book. Final presentations will be presented, by the students, to our participating organization(s) for evaluation.

_This two-credit course will meet in the first seven weeks of the semester._

Syllabus

**Emotions in Motion**

(2 Points) ITPG-GT.2020.1 Mon 3:20pm to 6:15pm Alon Chitayat

"I was giving the demo to someone a little while ago, and I finished the demo and I said what do you think? They said 'You had me at scrolling.'". (Steve Jobs)

Motion design has become an incredibly important component in UX/UI design over the last few years.

When used as more than just a subtle design detail, animation can provide cues, guide the eye, and soften the sometimes-hard edges of digital interactions. It can improve the user experience.

Following Disney's 12 Principles of Animation, motion has the power of adding surprise and delight to functional interactions. Google's new "Material Design" language sets the ground for defining how to use motion as part of the design process.

This course is focused on basic and advanced animation techniques and principles, to further add character and expression to digital and tangible interfaces. The main tool to be used is Adobe After Effects.
This two-credit course will meet the first six weeks of the semester.

Syllabus

Hardwired for Stories Out Loud: Why Stories Matter

(2 Points) ITPG-GT.2755.1 Tues 3:20pm to 5:50pm Adaora Udoji

Storytelling may be the "new" thing in technology, but it's way more than a buzzword. It's so central to how we learn, communicate, think and invent that we may indeed be hardwired for storytelling.

It may also be one of the most important skill you can learn for your career. It is the ability to communicate your ideas effectively, and be the best spokesperson for those ideas. If you want to be ready and more confident in your presentation skills for Thesis...and the rest of your life...this course is for you. This course is part seminar and part training in the art of how to present your ideas well.

In this course, you will: 1. explore what a story is, why stories work 2. design and build a framework based on the cross discipline principles (you tell stories all the time, and have the power to do it well. 3. apply it to the work you are doing-- whether representing yourself, your ideas, the things you build or want to build.

This seminar examines and deconstructs verbal storytelling as a discipline in its own right. It is an exploration of speaking and storytelling as a fundamental building block of human evolution and innovation. We will look at the learnings from ancient times through modern scientific research—looking at theories attempting to explain what happens physiologically and psychologically when we are moved by a spoken narrative.

This is a contextual approach that will focus on both the theory and the application in the marketplace of developing and delivering narrative as it relates to presenting oneself, a product or a service.

As such, we seek to understand what drives current trends toward narrative education and storytelling as a competitive advantage in learning, communicating, persuading and influencing.

Students will also contribute to designing a collaborative verbal communication template for the class and for the Final Project: a presentation that applies some of the concepts learned to themselves or their projects, products, ventures and/or service concepts.

This two-credit course will meet the last seven weeks of the semester.

Syllabus

Immersive Listening: Designing Sound for VR

(2 Points) ITPG-GT.2022.1 Wed 6:30pm to 9:00pm T.K. Broderick
Until recently 3D sound was a novelty reserved for special uses and reaching a limited audience, no medium in popular culture has been as inherently dependent upon spatial audio as virtual reality. The widespread and standardized implementation of surround sound in film brought cinema to a new level of immersion, but is limited to theatrical exhibition and home theater systems. Today a considerable amount of content is consumed on mobile devices and laptops which excludes the cinematic experience of spatial sound. With the current rise of cinematic VR and the blurring line between gaming and experiential VR, spatial audio is no longer just an added bonus, but rather a necessity in designing immersive VR experiences. In this course we will explore the emerging field of 3D sound design and for both 360 video and game engine-built VR using a digital audio workstation, Unity, and 3D audio plugins.

*This two-credit course will meet the last seven weeks of the semester.*

**Syllabus**

### Intro to 3D for Printing

(2 Points) ITPG-GT.2757.1      Tues 6:30pm to 9:00pm      Xuedi Chen

3D environments and objects are powerful prototyping tools. This class will introduce the basics of 3D modeling techniques in Rhino and students will learn to create assets for prototyping and 3D printing. The class will take an industrial design approach to design and build with specifications and materials in mind. Students will learn to think, plan, design, and produce well thought-out objects to fit their specific needs. (examples: motor mounts, enclosures, wearables etc.)

*This two-credit course will meet the first seven weeks of the semester.*

**Syllabus**

### Intro to Fabrication

(2 Points) ITPG-GT.2637.1      Wed 09:00am to 11:30am      Benjamin Light
(2 Points) ITPG-GT.2637.2      Thur 09:00am to 11:30am      Benjamin Light
(2 Points) ITPG-GT.2637.3      Wed 09:00am to 11:30am      Benjamin Light
(2 Points) ITPG-GT.2637.4      Thur 09:00am to 11:30am      Benjamin Light

Time to get your hands dirty. Prototypes need to be created, motors have to be mounted, enclosures must be built. Understanding how things are fabricated makes you a better maker.

But hardware is hard. You can't simply copy and paste an object or working device (not yet anyway), fabrication skills and techniques need to be developed and practiced in order to create quality work. You learn to make by doing.

In this class you will become familiar and comfortable with all the ITP shop has to offer. We will cover everything from basic hand tools to the beginnings of digital fabrication. You will learn to use the right tool for the job.
There will be weekly assignments created to develop your fabrication techniques. There will be in class lectures, demos, and building assignments. Emphasis will be put on good design practices, material choice, and craftsmanship.

*Sections 1 and 2 of this two-credit course will meet in the first seven weeks of the semester; sections 3 and 4 will meet in the last seven weeks of the semester.*

**Intro to PCB Fab**

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<th>(2 Points) ITPG-GT.2023.1</th>
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<th>Andrew Sigler</th>
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This is 7-week skill building course for students to learn how to grow from a breadboard to a custom surface mount board, without leaving the floor. Prototyping circuitry is getting easier and cheaper, and the tools and processes available at ITP allow students to cheaply make their circuits any shape and aesthetic they want, while increasing robustness and reproducibility. Students will learn a new tool or process each week, and using those new skills to build a final project. They will learn such as how to work with surface mount parts, etch a board design, read a schematic, design a circuit, and use a micro-milling machine. Other areas that may be covered include acid etching, schematics, designing circuits in illustrator and Eagle, and using the OtherMill. Students will present a final project of their choosing during the final class.

*This two credit course will meet the first seven weeks of the semester.*

**Syllabus**

**Pop Up Window Displays**

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<th>(2 Points) ITPG-GT.2956.1</th>
<th>Wed 6:30pm to 9:00pm</th>
<th>Gabe Barcia-Colombo</th>
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In New York City, every storefront window has the possibility to tell a story, spark a conversation or inspire an interaction. This workshop will focus on creating innovative interactive pop up installations designed for public window displays. A successful window is one that clearly delivers a message directly to the public. How do we create interactive displays that engage the public with a distinctive voice or style? Over seven weeks, students will concept, prototype and build an interactive experience meant to be installed in a storefront or commercial display. This course will explore lighting, design, and budgeting of durable interactive window installations. Previous fabrication or programming experience is encouraged.

*This two-credit course will meet the first seven weeks of the semester.*

**Surveillance Society: Making Sense of the Data Trails We Leave Behind**

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<th>(2 Points) ITPG-GT.2024.1</th>
<th>Fri 09:00am to 11:55am</th>
<th>Danah Boyd / Gilad Lotan</th>
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Data are created and collected all around us, trails left from interactions in social media, accessible through streams, feeds, APIs, and data-stores. These data are used to power a growing number of services, modeled not only off our own interactions but also interactions
of our friends and larger network of connections. Even if well intended, the growing range of uses of systems that algorithmically ingest our data means there are a growing number of unintended consequences and inherent biases. In order to untangle some of these issues, we'll dive into the literature, while running our own data analyses on captured surveillance data, from system logs, and NYPD datasets to mobile phone logs.

This is an advanced technical class. There will be a mandatory tutorial session beforehand. You are expected to be proficient in the Python programming language before the start of the class. We will hit the ground running, and move aggressively fast. We will use the iPython notebook environment, and get to know libraries such as: Pandas for time series analysis, NLTK for Natural Language Processing, and Scikit-learn for some Machine Learning. We'll also learn to leverage existing API's to enhance our datasets and models. There will be both reading and coding assignments every week. Your final projects will be group based.

#Surveillance, #Mobile, #Location, #Data

This two credit course will meet the last seven weeks of the semester.

Syllabus

Testing Tomorrow: Speculation as Process

(2 Points) ITPG-GT.2741.1 Tues 3:20pm to 5:50pm Chris Woebken / Richard The

The image of the city of New York is significantly defined by technologies. From Edison’s electricity grid enabling artificial light at night, to elevators enabling skyscrapers, to Uber drivers enabled by smartphones to navigate the city without knowing the streets by heart. How might we guide developments of future systems and technologies to influence how we experience New York in the future?

The class will start with an introduction to speculative design methods and a rapid prototyping sprint based on students’ own observations in the city. This introduction is followed by a workshop with experts touching on societal, economic, environmental and ecological issues relevant to NYC today. Using this research as a basis for extrapolation, students develop speculative prototypes of potential future technologies addressing these issues. The speculative prototypes investigate possible tomorrows from a conceptual, critical and aesthetic point of view. These speculative concepts will be “tested” by placing them in real world situations in the city today to create a forum for discourse and debate.

The process will be informed by a field trip and lectures by relevant research organizations, a crit with external designers, short workshops, weekly readings and a final exhibition.

This two-credit course will meet the first seven weeks of the semester.

Syllabus

Culinary Physics
This studio and seminar course explores the basic principles of food biochemistry, enzymology and food processing and how they relate to memory, the senses and the processing of information. Students will also learn basic principles of molecular gastronomy and modernist cuisine as framing devices for understanding how food also functions in the context of bodily health, environmental health as well as cultural and political narratives. Our food system consists of more than food production and consumption and this class will address how science and food science plays a more integral role in this system and how this knowledge can be mined for work that creatively and functionally contributes to this emerging field. Assignments for the class will be based on the incorporation of food science into design and technology projects that uses food as a substrate to explore and illuminate information within the food system. Workshops involve using liquid nitrogen + hydrocolloids as well as creating performative food objects and a Futurist meal.

Note: This course will meet in the Education Building, 35 West 4th Street, 10th Floor, Room 1080 (Kitchen).

**Syllabus**

**Design for the Real World: BeatRockers @ the Lavelle School**

(3 Points) ITPG-GT.2105.1  Thur 6:30pm to 9:00pm  Claire Kearney-Volpe

In this multidisciplinary course, students will work collaboratively to research, design, and develop a system of client-centered data-management, musical interfaces and interactive learning tools for the Beat Rocker beat boxing program at the Lavelle School for the Blind. The Beat Rocker Program incorporates a unique beat-boxing/speech therapy curriculum and children that are engaged in the program excel in both areas. Students in the class are expected to gain practical experience in user research/testing, human-centered design and the prototyping process.

The class will be split into three sections: 1) Client/User Research, 2) Design and Prototyping 3) Testing

**Syllabus**

**Developing Assistive Technologies**

(3 Points) ITPG-GT.2446.1  Tues 6:45pm to 9:00pm  R. Luke DuBois / Anita Perr

This multi-disciplinary course allows students from a variety of backgrounds to work together to learn about and develop assistive technology. Partnering with outside organizations, students will work in teams to identify a clinical need relevant to a certain clinical site or client population, and learn the process of developing an idea and following that through to the development of a prototype product.

This course provides an overview of some of the assistive technologies currently used by people with disabilities to participate in life’s activities, including those used for computer access, mobility, and activities of daily living (ADLs). Working in small groups, you will work with a mentor with a disability to solve a problem by creating a tech solution making the problem easier to deal with. We have a number of ongoing projects such as developing
interactive activities to improve balance of pre-schoolers with hearing impairments and cochlear implants, or working with a deaf woman in Argentina to develop a tool that can allow her to participate in group discussions. Other projects may include working with people with physical and sensory disabilities. This course provides you your own evidence of the benefit of using client-centered design with input from multiple professionals.

**Interaction Design Studio**

(3 Points) DM-GY.6143.1  Mon 6:30pm to 9:00pm  R. Luke DuBois

Introduction

The Interaction Design Studio is a graduate production course that looks at the ways in which we can build compelling interactions through a combination of software engineering and best practices in HCI. For this course, students will investigate standard (keyboards, mice), expanded (controllers, cameras) and bespoke (custom-built) physical interfaces for sensing user input and look at ways in which these inputs can be mapped in software to develop successful experiences. Students will be assigned regular case studies and design sketches exploring the pros and cons of different interfaces; they will also develop and user-test a semester-length design project using a physical interface in a novel way to create a tool, a performance, an installation, or something in between. The course will be hardware and software agnostic but will be taught primarily in Max/MSP/Jitter, a visual development environment for real-time media.

Course Objectives

Students in this course will:
- familiarize themselves with best practices in HCI through a series of case studies, informed by readings in cognitive analysis.
- apply these best practices to a variety of interface tasks using software.
- learn standard computer interface protocols (serial interfaces, network interfaces) to understand design from a standpoint of maximum interoperability and flexibility.
- experiment with different techniques for mapping a user input under a variety of situations.
- propose and develop a complete experience as a final project.

**Art Strategies**

(4 Points) ITPG-GT.2785.1  Wed 3:20pm to 6:15pm  Marina Zurkow

Art is not a monolithic category!

This class is an introduction to the diverse practices gathered under the category “Visual Art.”

This world of visual art includes sound installation and performance, and happens not only in galleries and museums, but also on streets, parks, rivers, in nail salons and rowboats. Artists now are hybrid beings, bringing into their work personal orientations of race, class, gender – even interspecies interests, focuses ranging from law, neuroscience, beekeeping, and the legacies of 125 years of “modern” experimentation.
Whether you want an introduction to art-making and the concerns that inform it, or have an established practice, this class is an opportunity to workshop new approaches for your own work, and begin to encounter the strategies and contexts of established artists working in the fields filed under Art.

“Art Strategies“ connects your studio practice with a survey class. In the spirit of “borrowing” or trying on, you may find newly resonant connections between your desire for expression, and an introduction to the practices and theoretical contexts of established artists.

This 12-week class will cover 6 art strategies, combining research with bi-weekly assignments. You will work individually on assignments, and in teams to present research. The assignments are structured as responses to the strategy topic – for instance, how can you create a quick prototype for a project using appropriation as your framework? How can you use a lens of feminist critique?

The class will be rich in individualized resources and critique, and will provide a topical survey of artists working in diverse ways. We will be conscious of the ways in which these practices integrate and challenge the uses of technology, and will also briefly address funding models, presentation, and contexts.

Example strategies include agit-prop, appropriation, corporate drag, counterfactual fiction, ethnography, expanded cinema, fictional documentary, identity politics, institutional critique, intervention, irony, kitsch, post-internet, procedural actions, social practice, the archive, theater of the absurd.

Movements we will look at include animal studies, bio-art, bio-politics, collectivism, Dada, environmental art, feminism (first-third wave), Fluxus, the post-natural, post-structuralism, post-black, occupy, queer theory, Situationists.

Syllabus

**Basic Analog Circuits**

(4 Points) ITPG-GT.2728.1  Mon 3:20pm to 6:15pm  Eric Rosenthal

Today’s mostly digital world also requires a basic knowledge of circuits that do not require computer processing. Analog circuits are simpler, lower cost, smaller and require less power and still perform many of the functions of digital circuits. In this course students will learn about the basic principles of electricity, components such as resistors, capacitors, diodes, transistors, audio amplifiers, power supplies and timers and circuits that interface to digital devices. The course includes circuits design and fabrication through lectures and hands on labs. Students will also learn the operation of electronic test equipment such as the digital multimeter, oscilloscope and function generator.

Syllabus

**Big Games**

(4 Points) ITPG-GT.2454.1  Fri 3:20pm to 5:50pm  Gregory Trefry
What happens to games when they escape the boundaries of our tabletops, desktops and living rooms? From massively multiplayer online games to mobile games that turn the city into a gigantic game grid, super-sized gaming opens up new spaces in which to play and seeps into the interstices of our days. Whether these games are measured in terms of number of players, geographical dimensions or temporal scope, they represent a new trend in which the "little world" created by a game threatens to swallow up the "real world" in which it is situated. This class is a hands-on workshop focused on the particular design problems of large-scale games. In this class students: develop a foundation of basic game design understanding from which to approach the specific issues particular to big games; analyze existing digital and non-digital large-scale games, taking them apart to understand how they work as interactive systems; and work on a series of design exercises that explore the social, technological, and creative possibilities of large-scale games.

**Syllabus**

**Big Screens**

(4 Points) ITPG-GT.2680.1  
Fri 3:20pm to 5:50pm  
Mimi Yin

This class is dedicated to experimenting with interactivity on large-scale screens. Students will work in pairs to develop one project over the course of the semester, culminating with a showing at InterActive Corps' 120 X 12-foot video wall at their corporate headquarters on 18th St. and the West Side Highway. A mock-up of the system is available at ITP for testing. Class time is divided between independent project development, critique, technical demonstrations, and field trips to IAC. Registration for this course will happen through a separate lottery which you will enter in pairs.

**Syllabus**

**Bodies in Motion**

(4 Points) ITPG-GT.2773.1  
Thur 6:30pm to 9:00pm  
Todd Bryant / Francisco Javier Molina

**Course Description**: This course provides an introduction to the concepts of motion capture and the motion capture production pipeline to perform and record 3D animations for film and video games as well as stream for live performances. Students will learn all of the tools for tracking props and performers using MAGNET’s cutting edge motion capture studio. Students will also develop concepts around the technology and integrate their data into 3D computer graphics along with keyframe and procedural animation and custom 3D assets to build final projects using the Unreal game engine.

**Program Learning Objectives**: To design a workflow of MoCap and ‘how to’ guides for diverse type of projects using motion capture and the basics of world and character building in the game engine Unreal. Reading assignments introduce students to constructed historical perspective of MoCap and investigates principles particular to animation and performance. The objective of the course is to allow students to understand the importance of pre-production and planning which includes notions of storytelling, 3D modelling and texturing,
best practices to capture the sessions, world building methods in video art and game development, and live show running.

Course Objectives

- To create storyboards and define recording shots before capturing data.
- To understand and use the correct motion capture pipeline
- To learn the skills to direct an effective motion capture session (best calibration)
- To learn the best practices for capturing and cleaning data
- To be able to apply the data to models in Maya, Unreal Engine, and Max/Jitter
- To be able to perform real-time retargeting for Live Performances

Course Structure

The class consists of a weekly lecture and a weekly 2 hour lab session. Students will work in groups and will be required to attend a self-selected lab session on weekends. Examples of motion capture projects will be presented in lectures and discussed in the classroom. Students must demonstrate satisfactory achievement of course objectives through fulfillment of one final project at the end of the semester and a mandatory submission for the program's showcase. Final projects will require students to use a wide variety of software and studio time at MAGNET's black box mocap studio. Students will be able to process their motion capture data for use in an animation or live performance. Collaboration with students and faculty from other programs is encouraged.

This four-credit course will meet at 2 Metrotech, Brooklyn, NY.

Syllabus

Business.101.1

(4 Points) ITPG-GT.2108.1 Mon 12:10pm to 3:05pm Jennifer van der Meer

This course is all about getting the levers of business to turn in your favor. We cover the basics of B-School that are curated for the ITP mindset. This course is experiential - you'll work in teams to develop a concept from the generation of an idea to launch or market test. We'll bring the best thinking and methods from MBA school, Lean Startup, Design Thinking, Business Model Canvas, Social Impact Entrepreneurship, Leadership Development, and Agile Development.

Key questions answered:

How do you get support for your ideas to attract customers, investors, and partners?
How do you strengthen your ideas to turn them into revenue, a career, or a company?
What's the smartest thinking in business that actually helps you get an idea launched in the world, or get a job?
What is the old-school MBA dominant logic that stops creativity - that you should know about - and learn to work around?
What are the new forms of company (B-Corps, LC3s, Co-Ops) and new flows of money (social impact investing, equity crowdfunding) and what do these mean for the dominant logic of business?
What are your individual and team values, motivation, and vision for the future - and how do you manifest your vision through business structures?
The course is for any student who wants to pursue an entrepreneurial path - either starting your own company, or becoming a leader in the company you join.

We will facilitate and organize student teams of 3-4 to develop a concept from idea through market test over the course of the semester. The primary focus of the course is the work of developing your network capital - building connections with potential customers, partners, investors, and subject matter experts to help define opportunities that the concept is designed to solve, and early stage product development. A strong component of individual leadership development is built into the course - for students to identify their core values, and to work in teams to co-create a vision for their business concept. Mentors and advisors from the NYC technology ecosystem and investment community will be invited as guest critics for the class.

Syllabus

**Cabinets of Wonder**

(4 Points) ITPG-GT.2470.1 Thur 12:10pm to 2:40pm Nancy Hechinger

If you were inventing a museum today, what would it look like? Who would be there? What would its main purpose be? The first museums were called Cabinets of Wonder. Usually, a viewer with a guide, often the collector, would open doors and drawers to see what was inside--amazing things from different parts of the world, different times. They were windows on the world to places the visitors would probably never be able to go; to see things they would never otherwise be able to see. And now there’s television, movies, the internet and travel. Why do people go to museums now? Will they in the future? Today, most museums seek to educate and to include more and more diverse visitors than they used to. How do people learn in public spaces? How do we know that they do? How can they make use of the new interactive technologies and not lose what’s special about them? The class is an exploration, observation and theory class with some design mixed in. Museum and exhibit visits are your primary assignments for the first half of the course—usually accompanied by a reading. You will also make some record of your visit (including a sketchbook, a dioramas, reviews) There will be guest speakers from Museums and exhibit design firms, and several field trips. In the second half of the course, you begin to imagine how you might reinvent a museum and develop a full-scale presentation of your own Cabinet of Wonder.

**Creative Computing/Interactions Lab UNDERGRAD**

(4 Points) ITPG-GT.1000.1 Tues 3:20pm to 5:50pm David Rios

What can computation add to human communication? Creating computer applications, instead of just using them, will give you a deeper understanding of the essential possibilities of computation. Conversely excitement about your computational project ideas whether they be in the domain of art, design, humanities, sciences or engineering will best propel your acquisition of skills necessary to realize those ideas. This course will begin with the expressive capabilities of the human body and how we experience our physical environment. The Physical Computing skills will allow you to go past the limitations of the mouse, keyboard & monitor interface and at locations other than the home or the office. The platform for the class is a microcontroller (Arduino brand), a very small inexpensive
single-chip computer that can be embedded anywhere and sense and actuate in the physical world. The core technical concepts include digital, analog and serial input and output. The second portion of the course focuses on fundamentals of computer programming (variables, conditionals, iteration, functions & objects) as well as more advanced techniques such as data parsing, image processing, networking, computer vision. The Java-based 'Processing' programming environment is the primary vehicle. Processing is more oriented towards visual displays on desktops, laptops, tablets or smartphones but can also connect back to the physical sensor & actuators from the first part of the class. The course is designed for computer programming novices but the project centered pedagogy will allow more experienced programmers the opportunity to play further with their project ideas and make lots of friends by helping the other students.

**Note:** *This is an undergraduate course for non-ITP students. Please register for OART-UT 20.*

**Syllabus**

**Data Art**

(4 Points) ITPG-GT.2571.1  
Mon 12:10pm to 3:05pm  
Jer Thorp

Fascinating and terrifying things are happening at the intersection of data and culture. Our lives are being constantly measured, and information about us is being surveilled, stolen, and commodified. Dialogue around this data revolution has been dominated by corporations, governments, and industry - but what about the arts? In this class, we'll investigate the means by which artists can engage (and are engaging) in the collection, processing, and representation of data. Using a research-focused, prototype-based approach, we'll build a series of collective and individual projects to interrogate the 'new data reality'. Students will use Processing, along with a variety of open-source data tools (such as D3.js, Miso, OpenRefine, MapBox & CartoDB).

**Design for Change**

(4 Points) ITPG-GT.2012.1  
Tues 3:20pm to 6:15pm  
Katherine Dillon

This 12-week course will examine the psychology of behavior and apply that insight as a framework to affect change. The first half of the semester will focus on researching and discussing human behavior and looking at case studies of how behavioral theories have been applied to motivate change.

In the second half of the semester students, working in pairs, will identify a societal issue that they are passionate about and develop a project that attempts, at scale, to move the needle on the issue in a positive way.

This class is for students with passion for an issue and enthusiasm to apply their creative and technical skills to solve real problems in meaningful ways. The course is both a seminar class and a production studio.

The second half of the semester students will focus on applying the learning. Students will identify a social problem that they hope to influence at scale. They will research and
document the problem, develop a concept to influence the behavior associated with the issue and prototype (or build) their solution.

**Designing for Data Personalization**

(4 Points) ITPG-GT.2761.1    Thur 6:30pm to 9:25pm    Samuel Slover

The world is awash with new data, but how can designers take the next step to make this data more meaningful in people’s day-to-day lives and interactions? Put differently, instead of giving people yet more data and visualizations to interpret, how can we personalize this data to provide simple insights that more intimately connect with what an individual really cares about?

In this class, we’ll examine how personalized design can give people more meaningful and pleasant experiences with their data interactions. We’ll explore how new technologies and designs are implementing these personalization strategies and how they’re being successful (or not). We’ll learn how to model, generate, and store our own datasets; how to build our own APIs; and ultimately how to design meaningful applications and experiences around this data.

We will do so by designing around our own data (as designing for the self is often the best starting place). Students will build an API around a personal dataset that they want to track and better understand, and then will design an application or experience around this personal data.

Students will learn techniques on how to work with existing Web APIs, how to build and use their own Web APIs (with Node.js and Mongodb), and will implement user-facing designs utilizing p5.js and other Web technologies. Class examples will be presented in Javascript. Javascript tutorials will be assigned as a pre-requisite for those with little to no Javascript experience.

**Syllabus**

**Designing for Digital Fabrication**

(4 Points) ITPG-GT.2890.1    Thur 3:20pm to 5:50pm    Daniel Rozin

The ability to digitally fabricate parts and whole pieces directly from our computers or design files used to be an exotic and expensive option not really suitable for student or designer projects, but changes in this field in the past 5 years have brought these capabilities much closer to our means, especially as ITP students. ITP and NYU now offer us access to laser cutting, CNC routing, and 3D stereolithography. In this class we will learn how to design for and operate these machines. Emphasis will be put on designing functional parts that can fit into a larger project or support other components as well as being successful on a conceptual and aesthetic level. In this class we will discover methods to design projects on CAD applications for total control of the result, and we will develop algorithmic ways to create designs from software (Processing) to take advantage of the ability to make parts and projects that are unique, customizable, dependent on external data or random. The class will include 3 assignments to create projects using the three machines (laser, router, 3D) and the opportunity to work on a final project.
Syllabus

**Designing for Live Performance**

(4 Points) ITPG-GT.2521.1   Tues 3:20pm to 5:50pm   Andrew Lazarow

For centuries, great works of music, theater, and dance, have combined art and science to make integrated performances that move audiences. Today, we are seeing exciting changes as artists experiment with video and real-time interactivity to draw audiences even deeper into the performance, and enhance the shared experience of the moment. This class explores conceptual approaches to design, industry-standard software, prototyping frameworks, and data flow programming to provide student designers with the cutting-edge tools necessary to confidently collaborate with writers, directors, and performers. Structured as a studio course, students will make designs for contemporary performance pieces, and collaborate with working artists to design original projects.

Syllabus

**Digital Imaging: Reset**

(4 Points) ITPG-GT.2550.1   Mon 12:10pm to 3:05pm   Eric Rosenthal

Digital cameras and printers are making photography more ubiquitous and more useful than ever. This course is a workshop that looks at changing the rules for capturing and printing digital imagery. By gaining a better understanding of the engineering fundamentals and limitations of digital photography, students can produce breathtaking images with all the benefits of digital media but with an image quality that rivals film. Students experiment using low cost, hands-on tips and tricks in software and hardware to capture high dynamic range, expanded color, night color, 3D, time lapse, and stop motion images using a digital camera and printer. While using mostly off-the-shelf tools, these experiments require students to dig down to see the nitty-gritty of today's and tomorrow's technologies for digitally sensing, encoding, compressing, transmitting and displaying images.

Syllabus

**DIY-VR**

(4 Points) ITPG-GT.2765.1   Mon 6:30pm to 9:25pm   Sarah Rothberg

The field of Virtual Reality is changing almost daily. New products and techniques now give us incredible control over the immersive VR experience, and the vocabulary for VR communication is now being written. Powerful game engines like Unity3D have lowered the bar for VR hobbyists and artists, and modern-day cell phones have all of the components necessary to render convincing VR in real-time. This class will focus on experimental and narrative VR projects. We will look at the history of visual storytelling and art, as well as critical analysis of media, as a starting point for conceiving our VR projects. We will continuously compare older mediums to VR in order to best understand what works well in a VR experience. We will also discuss the history of VR, and look at recent VR projects.
The class will cover 3 broad conceptual themes, which will give focus to the projects. The themes are recontextualization, symbolism, and mythology. Some techniques that we will explore are 2D media in a 3D space, 3D world building, VR GUI, and external networked interfaces.

Our primary tool will be Unity3D. Unity allows us to combine a variety of media - images, audio, 3D models, and programming - into a single real-time VR experience. Although VR creation has never been easier, there will be a learning curve for most students. Be prepared to spend time outside of class learning new skills. Because of the diversity of skills required, students are encouraged to collaborate. Success in the class is based on weekly assignments, a midterm project, and a final project. Class participation and discussion are also required. No previous knowledge of Unity3D is necessary, but students should be motivated to explore and learn on their own. Ideally, students will have completed either one animation class, or one post-ICM programming class.

Syllabus

Educate the Future

(4 Points) ITPG-GT.2745.1 Mon 09:00am to 11:55am Gregory Dorsainville

The New York Times reported in the spring of 2014 that fewer High School grads have opted to attend College, halting a trend of increasing matriculation for four plus decades. What is going on? As education in the US experiences a shift from being perceived as the most obvious method of higher social mobility, the viability of Higher Education is in doubt. The product of Higher Education is ripe for upheaval with new thinking in the presence of the digital, mobile, and social media revolutions that have changed many industries this decade.

This course will ask you to observe, imagine and create the vision of Higher Education, 1 year, 5 years, 10 years into the future. How will people learn? How will teachers teach? How will you measure your academic success? How will students connect to peers and experts? Who will be able to attend this future? Will higher ed be on your wrist or in a building? Will education be gamified?

Our weekly conversation will have voices from people helping to shape and improve education today, with futurists, with designers, and with content creators. We will explore the current education landscape globally. We will restructure education in terms of experience design, with the goal of improving the experience for the learner. We will discuss how our experiences have motivated our learning. At the end we will design experiences that capture the essences of these visions.

Fandom

(4 Points) ITPG-GT.2965.1 Wed 6:30pm to 9:00pm Zoe Fraade-Bianar

Fandom is the study of communities that form around popular culture, whether based on a shared love of Star Wars, Taylor Swift, Harley Davidson bikes, PBR beer, or 3D printing. Proper fan management can lead to hordes of adoring, evangelical users; bad fan interaction can spell shame and embarrassment. From Pokemon to Air Jordans, this
class explores the influences and motivations that separate fans from mere consumers. We chart the evolution of fan culture as a social and economic force, from early 16th century religious manias to its rebirth in modern-day geek and nerd culture. Along the way we’ll discuss fangroup commercialization, appropriation, monetization, and other fan techniques available to us as creators.

Syllabus

**Hacking Contemporary Political Rhetoric**

(4 Points) ITPG-GT.2114.1 Mon 6:30pm to 9:25pm Ben Moskowitz

Election 2016 highlights the need for continued scrutiny of the news media’s role in American politics. The course will take a hands-on approach to American presidential politics and media literacy in general, exploring how citizens can use web video to deconstruct, remix, and re-engineer messages created for primetime.

As part of this class, students will co-design and facilitate an open online event for members of the extended NYU community to learn about, collaboratively document, and make sense of the 2016 American presidential election in its culmination and aftermath.

We’ll design new and better ways for people to understand and shape political discourse, like: enabling Facebook users to quote and contextualize video from candidate speeches, mining terabytes of captioned video stored in the Internet Archive’s TV news archive for insights, helping high school civics students to generate supercuts; and more.

Participants will create new technologies for remixing political video, gain experience as media literacy educators, and develop historical and contemporary perspectives on how the media shapes elections.

**Hacking Story Frameworks: For Social Impact/Social Issues**

(4 Points) ITPG-GT.2107.1 Tues 6:30pm to 9:00pm Yasmin Elayat

There is a new storytelling landscape evolving across journalism, film, media and art driven by emerging technologies, cultural trends, and a new breed of audience that are themselves content creators. This class explores how technology can be leveraged to tell stories in new ways for social issues by hacking narrative frameworks, pushing mediums forward, and engaging audiences in the storytelling experience by inviting them as collaborators or immersing them on a deeper level. We will explore how technology can be transformative in creating empathy and promoting understanding. We will work on projects that raise awareness, transform perceptions or inspire change around a social justice issue, story or community.

Because we are building richer, more immersive experiences, new media storytelling has become a design exercise. We are no longer bound by frameworks or constructs, in fact, technology has opened up a new world of more social, communal experiences. We need to better understand and design for our audiences and in this class we will learn experience design principles in addition to social impact strategy and learn how to build strong
narrative worlds.

This class is technology agnostic, which means we will explore different mediums and technology in service of our stories; i.e. story first, tech second.

Objectives
The objectives of this course are for students to gain a deep understanding of this new emergent storytelling space, learn how different industry players are influencing various mediums, and to deliver a social impact project around a topic of their choosing. The focus of the first half of the semester is building the skill set to become better story designers, while the second half of the semester we learn to use these tools and apply them to the final project from concept to production, testing along the way via workshops, prototypes and user tests.

This class embraces experimentation as part of the design process. Students will learn how to:

- Build strong narrative experiences
- Story Design and use experience design principles
- Prototype and user test
- Use emergent tools, platforms and technologies (VR/AR/MR, multisensory, web)
- Develop projects from concept to production

Deliverables
- One individual midterm project
- One group final project
- Class presentations and peer reviews
- Weekly readings or assignments

Syllabus

**Learning Machines: Theory to Practice**

(4 Points) ITPG-GT.2011.1 Mon 12:10pm to 3:05pm Patrick Hebron

Over the last decade, machine learning has undergone a philosophical Renaissance through the innovation of a set of computational models and algorithms often referred to as Deep Learning. These ideas have led to concrete advancements in long-standing applied domains such as classification and time-series prediction. But the real excitement over Deep Learning lies in its yet untapped potential. This course will introduce some of the core technical concepts within Deep Learning and explore how these emerging capabilities will transform the next generation of computing interfaces such as search engines, intelligent assistants, connected homes and open-world video games. In the first half of the semester, we will use class time and weekly incremental programming exercises to explore the underlying theory and key algorithms of machine learning as well as some of the more abstract insights offered by Deep Learning into vexing phenomenological questions like:

Why do we replay and reconfigure memories in our dreams?

Why do we use only a small portion of our brains at any given time?

Why can we catch a baseball without being able to recite Newton’s equations?
And most importantly, what defines learning as a phenomenon?

In the second half of the semester, we will look at the emerging applications of these technologies to art, design and toolmaking, culminating in final projects that relate the techniques studied in this course to any field of human-computer interaction.

Required Text:

Programming Platform:
This course will be taught in Python and will expose students to scientific computing and visualization libraries including SciPy and Matplotlib.

Syllabus

**Live Web**

(4 Points) ITPG-GT.2734.1 Tues 12:10pm to 2:40pm Shawn Van Every

The World Wide Web has grown up to be a great platform for asynchronous communication such as email and message boards which has extended into media posting and sharing. Recently, with the rise of broadband, more powerful computers and the prevalence of networked media devices, synchronous communications have become more viable. Streaming media, audio and video conference rooms and text based chat give us the ability to create new forms of interactive content for live participants.

In this course, we’ll focus on the types of content and interaction that can be supported through web based and live interactive technologies as well as explore new concepts around participation. Specifically, we’ll look at new and emerging platforms on the web such as HTML5, WebSockets and WebRTC using JavaScript and Node.js.

Experience with web technologies are (HTML and JavaScript) are helpful but not required. ICM level programming experience is required. (Social Software, Internet, Video)

Syllabus

**New Interfaces for Musical Expression**

(4 Points) ITPG-GT.2227.1 Tues 6:30pm to 9:00pm Greg Shakar

The course focus is on the design and creation of digital musical instruments. Music in performance is the primary subject of this class. We approach questions such as "What is performance?" "What makes a musical interface intuitive and emotionally immediate?" and "How do we create meaningful correlations between performance gestures and their musical consequences?" Over the semester, we look at many examples of current work by creators of musical interfaces, and discuss a wide range of issues facing technology-enabled performance - such as novice versus virtuoso performers, discrete versus continuous data control, the importance of haptic responsiveness as well as the relationship between musical
performance and visual display. Extensive readings and case studies provide background for class discussions on the theory and practice of designing gestural controllers for musical performance. Students design and prototype a musical instrument - a complete system encompassing musical controller, algorithm for mapping input to sound, and the sound output itself. A technical framework for prototyping performance controllers is made available. Students focus on musical composition and improvisation techniques as they prepare their prototypes for live performance. The class culminates in a musical performance where students (or invited musicians) will demonstrate their instruments. Prerequisites: ITPG-GT.2233 (Introduction to Computational Media) and ITPG-GT.2301 (Physical Computing).

Syllabus

**Programming Design Systems**

(4 Points) ITPG-GT.2843.1  Tues 09:00am to 11:30am  Rune Madsen

Until recently, the term Graphic Designer was used to describe artists firmly rooted in the fine arts. However, as design products are becoming increasingly dynamic, the field of design is changing too.

In this course students explore the field of graphic design through code. Class time will be divided between exploring design topics like colors, grids and typefaces, and applying these towards computational topics like randomization, repetition and generative form. A significant part of the class will be devoted to understanding systems as an important part of our design history.

Weekly readings include relevant writings from the history of graphic design (Josef Muller-Brockmann, Paul Rand), articles from the history of computation (Vannevar Bush, Douglas Englebart, Martin Krampen) and everything in between (Sol Lewitt, Edward Tufte, etc).

The class aims not only to teach the students how to create design systems in code, but also to have something interesting to say about it.

The class requires ICM or similar programming background. This class is built on the class “Printing Code”, and students who took that class should not take “Programming Design Systems”

Syllabus

**Programming from A to Z**

(4 Points) ITPG-GT.2536.1  Tues 09:00am to 11:30am  Daniel Shiffman

This course focuses on programming strategies and techniques behind procedural analysis and generation of text-based data. We’ll explore topics ranging from evaluating text according to its statistical properties to the automated production of text with probabilistic methods to text visualization. Students will learn server-side and client-side JavaScript programming and develop projects that can be shared and interacted with online. There will be weekly homework assignments as well as a final project.
Syllabus

**Project Development Studio**

(4 Points) ITPG-GT.2564.1       Wed 12:10pm to 2:40pm       Stefani Bardin

This is an environment for students to work on their existing project ideas that may fall outside the topic areas of existing classes. It is basically like an independent study with more structure and the opportunity for peer learning. This particular studio is appropriate for projects in the area of interactive art, programing, physical computing and digital fabrication. There are required weekly meetings to share project development and obtain critique. Students must devise and then complete their own weekly assignments updating the class wiki regularly. They also must present to the class every few weeks. When topics of general interest emerge, a member of the class or the instructor takes class time to cover them in depth. The rest of the meeting time is spent in breakout sessions with students working individually or in groups of students working on related projects.

**Understanding Networks**

(4 Points) ITPG-GT.2808.1       Tues 3:20pm to 5:50pm       Thomas Igoe

Interactive technologies seldom stand alone. They exist in networks, and they facilitate networked connections between people. Designing technologies for communications requires an understanding of networks. This course is a foundation in how networks work. Through weekly readings and class discussions and a series of short hands-on projects, students gain an understanding of network topologies, how the elements of a network are connected and addressed, what protocols hold them together, and what dynamics arise in networked environments. This class is intended to supplement the many network-centric classes at ITP. It is broad survey, both of contemporary thinking about networks, and of current technologies and methods used in creating them. Prerequisites: Students should have an understanding of basic programming (Intro to Computational Media or equivalent). Familiarity with physical computing (Intro to Physical Computing or equivalent) is helpful, but not essential. Some, though not all, production work in the class requires programming and possibly physical and electronic construction. There is a significant reading component to this class as well.

Possible topics include:

* topologies: how to think about them (nodes and links), how few workable ones there are, and how there's no topology so stupid it isn't in use some place.
* addressing and routing: what a namespace is, three ways to generate a name (nesting, serial uniqueness, random pseudo-uniqueness), the difference between smart and dumb networks, why the phone network and the internet differ even though they use the same wires
* protocols: envelopes and contents, the stack and the reference lie, end-to-end principles, reliability vs. speed tradeoffs
* scale: more is different, scale breaks otherwise workable systems, makes redundancy and degeneracy critical, tends to push systems
* a discussion of security and its effects
Possible exercises include:
* Basic socket communication, both software and embedded hardware versions
* Client-server programming
* A group protocol/messaging exercise
* An HTTP/RESTian model exercise

Syllabus