If Texas Tech University campus operations are required to change because of health concerns related to the COVID-19 pandemic, it is possible that this course will move to a fully online delivery format. Should that be necessary, students will need to have access to a webcam and microphone for remote delivery of the class. Additionally, students will need to have access to Blackboard, Zoom, & Raider Email.

ARCH 4601 ARCHITECTURAL DESIGN VII

COLLEGE OF ARCHITECTURE, TEXAS TECH UNIVERSITY

FALL 2020

INSTRUCTORS
Catherine Söderberg Esper, Coordinator, Visiting Assistant Professor, catherine.soderberg@ttu.edu
Rosa Ramos, Instructor, roxoly@gmail.com

Futuro House by Matti Suuronen; Happy Place; Plastic Recycling Plant

COURSE TITLE
Plastic Play Plant: Plastic Playspace + Waste Facility

CATALOG DESCRIPTION
Prerequisite: ARCH 3602. Provides instruction in advanced architectural design projects. Students develop integrated design skills negotiating the complex issues of program, site, and form in a specific cultural context. Integrates aspects of architectural theory, building technology, and computation into the design process.

COURSE DESCRIPTION
Students will design a plastic processing facility in Downtown El Paso that also functions as an immersive and 'highly instagrammable' sensorial playscape made entirely of plastic waste. The aim of this project is to seize a waste stream of large volume problematic material and transform it into a new raw building material.

After handling nearly half of the world's recyclable waste for the past quarter century, in January 2018, China enacted the "National Sword" policy which banned the import of most plastics from the United States.[1] Municipalities are now forced to deal with their own trash instead of exporting it, and have discovered that there are virtually no domestic manufacturers that want to buy this waste in order to turn

---

[1] "Piling Up: How China's Ban on Importing Waste Has Stalled ...." 7 Mar. 2019,
https://e360.yale.edu/features/piling-up-how-chinas-ban-on-importing-waste-has-stalled-global-recycling. Accessed 14 Jan. 2020.

it into something else.[2] El Paso emerges as one of the most affected cities in Texas.[3] As concerns over plastic pollution increase, the proposed architecture will provide a solution for managing El Paso's municipal plastic waste while simultaneously providing an amusing experience that exemplifies the tangible possibilities of upcycling and giving new life to used plastic for architectural applications. The facility will collect, sort, clean, shred, and mold plastic into new architectural products. The playspace will be assembled from those newly fabricated products and users will actively participate in promoting the circular economy philosophy by posing for selfies with captivating and whimsical backdrops.

PLASTIC

A study has found that just 9% of all plastic ever produced has been recycled,[4] and after one short use, ⅓ of all single-use plastic packaging leaks into ecosystems where they can stay for hundreds of years.[5] By 2050, it is alarmingly projected that there could be more plastic in our oceans than fish in the sea.[6] 80% of marine bound plastic waste is due to poor waste management on land, but that problem can be addressed by re-thinking how end-of-life plastics can be upcycled. The goal is to keep plastics out of landfills and our oceans by turning them into new products. The new plastic economy aims to drive a movement towards a system in which plastics are designed to be used over and over again.[7]

PLAY

The world has seen an increase in "made-for-Instagram," spectacle exhibitions- suggesting a growing obsession with this selfie-dominated culture.[8] And while many of these immersive rooms are light-heartedly and innocently themed, some environmental artists are designing these exhibits to bring awareness to global ecological crises. ARCADIA EARTH in New York City is one such multi-room exhibition that features video projections, augmented reality, and virtual reality engagements that hope to spark collective action against climate change.[9] Similarly, the plastic playspace will guide users through a plastic world via mesmerizing landscapes and tactile surfaces made from upcycled plastic artifacts.

PLANT

The Borderplex region of El Paso, Texas and Juarez, Chihuahua forms the largest bi-national community in the world- identifying it as a superiorly positioned hub for high-tech manufacturing support to North American and global industries.[10] Since the 1970's, maquiladoras, or factories, have become an integral part of cities like Juarez. They have evolved over the years to be part of an industry that combines technological innovation with Mexico's thriving workforce. The studio's proposed mixed-use waste plant will be located in Downtown, El Paso- surrounded by a handful of art museums and adjacent to a main underground rail network.

[2] "Americans' plastic recycling is dumped in landfills ...." 21 Jun. 2019, https://www.theguardian.com/us-news/2019/jun/21/us-plastic-recycling-landfills. Accessed 14 Jan. 2020.
[3] "How recycling has changed in all 50 states | Waste Dive." https://www.wastedive.com/news/what-chinese-import-policies-mean-for-all-50-states/510751/. Accessed 14 Jan. 2020.
[4] "(PDF) Production, use, and fate of all plastics ever made." https://www.researchgate.net/publication/318567844_Production_use_and_fate_of_all_plastics_ever_made. Accessed 14 Jan. 2020.
[5] "More plastic than fish in the sea by 2050, says Ellen ...." 19 Jan. 2016, https://www.theguardian.com/business/2016/jan/19/more-plastic-than-fish-in-the-sea-by-2050-warns-ellen-macarthur. Accessed 14 Jan. 2020.
[6] "Plastic waste inputs from land into the ocean - ISWA." 12 Feb. 2015, https://www.iswa.org/fileadmin/user_upload/Calendar_2011_03_AMERICANA/Science-2015-Jambeck-768-71__2_.pdf. Accessed 14 Jan. 2020.
[7] "the new plastics economy rethinking the future of plastics." https://www.ellenmacarthurfoundation.org/assets/downloads/EllenMacArthurFoundation_TheNewPlasticsEconomy_Pages.pdf. Accessed 14 Jan. 2020.
[8] "Selfie Factories: The Rise of the Made-for-Instagram Museum ...." 27 Sep. 2017, https://www.wired.com/story/selfie-factories-instagram-museum/. Accessed 14 Jan. 2020.
[9] "Envisioning Climate Change at Arcadia Earth – DSI / Social ...." 30 Oct. 2019, https://dsi.sva.edu/blog/2019/10/envisioning-climate-change-at-arcadia-earth/. Accessed 14 Jan. 2020.
[10] "The Ciudad Juarez - El Paso Borderplex: - Industry Today." https://industrytoday.com/article/the-ciudad-juarez-el-paso-borderplex/. Accessed 15 Jan. 2020.

PROJECT 1 | PRECEDENT TYPOLOGIES (2.5 Weeks)
Students will work partly in teams of two to conduct a shared analysis of four precedents; (1) *an all plastic building*; (2) *an 'instagrammable' sensorial space*; (3) *an industrial recycling machine*; and (4) *an architectural product made from plastic waste*. From the all plastic building, students will analyze the spatial and structural capabilities of single shelled, monocoque plastic composite buildings. Students will research the fabrication process of each stressed skin panel, and understand their lightweight, modular properties. From the 'instagrammable' space, students will discover the immersive qualities of artistic and playful installations that are composed of interactive obstacles and spatial elements that hang, float, or are situationally placed to entice the desirable selfie. For the recycling machine, students will research and document the linear process of plastic waste management from initial receiving and sorting, to final production of new raw material. A taxonomy of the mechanical kit of parts will be digitally modeled taking into account the dimensions of all machinery. Lastly, from the upcycled plastic product, students will learn how plastic waste can be morphed into shreds, shards, particles, sheets or rope and formed through various different processes into a new material.

PROJECT 2 | PLASTIC TECTONICS (3.5 Weeks)
The public plastic playspace is to consist of modular, all plastic, immersive rooms that weave through, above, below and around the private waste processing facility. The students will choose plastic artifacts from a specific waste stream and digitally model them in Rhino. These artifacts will then be transformed into a raw material which will be used to form and sculpt the spatial sequences of each room using digital parametric modeling tools. Interior surfaces must allow for the user to stand, sit and lay as they journey from room to room. Students will take into consideration the desired tactile effect whether it be rigid, spongey, flexible, smooth or fibrous.

PROJECT 3 | PLASTIC PLAY PLANT (8 Weeks)
Students will complete the design of the entire building- providing spaces for both the private waste facility, as well as the public playspaces. Students will respond to the existing site which is situated adjacent to the railroad and within the museum center of Downtown El Paso. Projects will be developed through detailed architectural models and drawings.

STUDENT LEARNING OBJECTIVES
1. To develop the ability to analyze architectural precedents in order to draw significant information regarding constructability, structure, and material.
2. To develop the ability to research fabrication methods used to innovate with materials.
3. To develop an ability to use parametric modeling paradigms to inform the design process.
4. To develop the ability to respond to specific environmental stewardship goals for an integrated architectural solution.
5. To develop the ability to identify, distinguish, separate and incorporate private and public activities into an architectural design solution.
6. To develop an ability to integrate building systems with an emphasis on structural members and tectonic envelopes.

STUDENT PERFORMANCE OBJECTIVES
1. To develop an understanding of material fabrication techniques.
2. To develop the ability to digitally model complex spatial forms.
3. To develop the ability to translate conceptual architectural iterations into a complete building that has a clear structural order, tectonic identity, materiality, circulation, envelope and detailing.

4. To develop the ability to clearly draw site plans, floor plans, site/building sections that respond to site characteristics and urban context.

MEANS OF EVALUATION
1. Deliverables

Weeks 1+2	Precedent Analysis
Week 3	Conceptual Hybrid Iterations
Weeks 4+5	Development of Machine and Enclosure in 3D
Week 6	Development of Spatial Forms
Week 7	Material Research
Week 8	Mid Term Review
Weeks 9+10	Digital Mapping
Weeks 11+12	Finalize 3D Model
Weeks 13+14	Finalize Plans, Sections and Elevations
Week 15	Renderings and Final Production, Final Review

2. Methods of Assessment
   a. Completion of deliverables in a timely manner
   b. Thoughtful engagement with critical questions regarding context

TEACHING METHODS
1. Case Study Analysis: Analyze the spatial and structural capabilities of single shelled, monocoque plastic composite buildings. Research the fabrication process of each stressed skin panel, and understand their lightweight, modular properties.
2. Material Research: Research how plastic waste can be morphed into shreds, shards, particles, sheets or tiles and formed through various different processes into a new material and iterate through varying fabrication techniques.
3. Digital Mapping: Map the sources of a plastic waste stream at the local and global scale.
4. Form-finding with Computational Tools: Iterate playful forms and explore the possible interior and exterior spatial qualities and structural logic for the sensorial museum and the plastic waste facility.
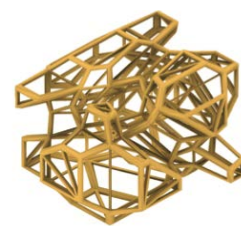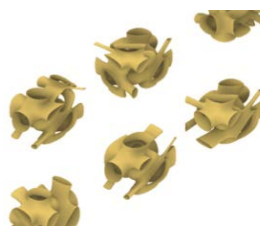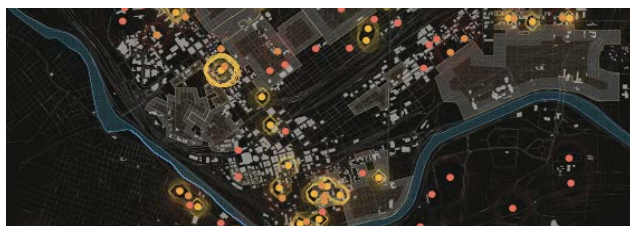
COURSE SCHEDULE

	S	M	T	W	R	F	S
1	23	Aug 24 Classes Begin **First Day of Studio** **Intro to P1**	25	26 Zoom Session 1:30-5:20	27	28 Zoom Session 1:30-5:20	29
2	30	31 Zoom Session 1:30-5:20	Sept 1	2 In-Person Meeting **P1.1 Pin Up**	3	4 Zoom Session 1:30-5:20	5
3	6	7 No Classes	8	9 Zoom Session 1:30-5:20	10	11 Zoom Session 1:30-5:20	12
4	13	14 In-Person Meeting **P1.2 Pin Up** **Intro to P2**	15	16 Zoom Session 1:30-5:20	17	18 Zoom Session 1:30-5:20	19
5	20	21 Zoom Session 1:30-5:20	22	23 Zoom Session 1:30-5:20	24	25 Zoom Session 1:30-5:20	26
6	27	28 In-Person Meeting **P2.1 Pin Up**	29	30 Zoom Session 1:30-5:20	Oct 1	2 Zoom Session 1:30-5:20	3
7	4	5 Zoom Session 1:30-5:20 **P2.2 Due**	6	7 Zoom Session 1:30-5:20	8	9 Zoom Session 1:30-5:20	10
8	11	12 In-Person Meeting **P2.3 Pin Up**	13	14 Zoom Session 1:30-5:20	15	16 Zoom Session 1:30-5:20	17
9	18	19 Zoom Session 1:30-5:20	20	21 Zoom Session 1:30-5:20 **Mid Term Review**	22	23 Zoom Session 1:30-5:20 **Intro to P3**	24
10	25	26 Zoom Session 1:30-5:20	27	28 Zoom Session 1:30-5:20	29	30 Zoom Session 1:30-5:20	31
11	Nov 1	2 In-Person Meeting **P3 Pin Up** **Intro to P4**	3	4 Zoom Session 1:30-5:20	5	6 Zoom Session 1:30-5:20	7
12	8	9 Zoom Session 1:30-5:20	10	11 Zoom Session 1:30-5:20	12	13 Zoom Session 1:30-5:20	14
13	15	16 In-Person Meeting **P4 Progress Pin Up**	17	18 Zoom Session 1:30-5:20	19	20 Zoom Session 1:30-5:20	21
14	22	23 Zoom Session 1:30-5:20	24	25 No Classes	26 No Classes	27 No Classes	28

15	29	30 Zoom Session 1:30-5:20	Dec 1	2 Zoom Session 1:30-5:20	3	4 Zoom Session 1:30-5:20 **Final Review**	5

REQUIRED TEXTS

Architectural Design, "Plastic Buildings" Vol. 40 No. 4 (April 1970)
Anthony Walker, "Plastics: The Building Blocks of the Twentieth Century"
Kate Franklin, "Radical Matter: Rethinking Materials for a Sustainable Future"
Billie Faircloth, "Plastics Now: On Architecture's Relationship to a Continuously Emerging Material"
Seetal Solanki, "Why Materials Matter: Responsible Design for a Better World"
Dirk Hebel, "Building From Waste: Recovered Materials in Architecture and Construction"
Alejandro Bahamon, "ReMaterial: From Waste to Architecture"

COURSE REQUIREMENTS

Arch 4601 is a senior level design class that requires substantial dedication and investment of student time, skill, and critical thought both during and after official studio hours. Students are required to have a personal computer which meets the school's minimum requirements. Technical difficulties, viruses, crashes, server and print bureau problems, or corrupted files will not be accepted as legitimate excuses. ALL WORK SHOULD BE CONTINUOUSLY SAVED AND REGULARLY BACKED UP.

GRADING

Grades will be calculated as follows:

Project 1 **20%**
Project 2 **20%**
Project 3 **25%**
Final Review **35%**

NAAB CRITERIA

A.5 Ordering Systems (Ability)
ARCH 4601 engages students in analytic and synthetic field exercises to record and communicate the underlying ordering systems of public spaces such as streets, squares and galleries in the urban setting.

A.6 Use of Precedents (Ability)
ARCH 4601 accentuates urban design skills, the understanding of urban infrastructure, and land use patterns and traditions incorporating precedents studies gained through first hand off campus study exploring the multifaceted interfaces occurring between culture and architecture at the scale of the city.

A.8 Cultural Diversity and Social Equity (Understanding)
ARCH 4601 is an advanced level architecture design studio which focuses on urban public space in a culture or locale different from what the student is generally familiar with. Students acquire an understanding of comprehension of people, place and context of different cultures and diverse social and spatial use patterns. They also engage in field observation, site analysis and mapping as well as documentation of spaces and activities.

B.2 Site Design (Ability)

Formal principles that have been used for this criteria include: A. Historical factors of site planning logic, site analysis, site design characteristics and site design process logic; B. Climate logic; C. Natural elements logic; D. Topographic elements logic; E. Circulation logic; F. Legal and economic factors logic. In ARCH 4601, the students will develop their projects by bringing the site and the man-made development together as a sustainable entity encompassing all the above principles.

ATTENDANCE POLICY

Students are responsible for attending all scheduled class meetings for the full class period. Class meetings include all course meeting times, reviews, and online sessions. Once a student reaches two unexcused absences, they will be asked to meet with the instructor. A total of four absences in a studio, or in a lecture class that meets two or three times per week, is considered excessive, requiring the student to drop the class or receive a grade of "F" in compliance with the drop deadlines. All absences are considered unexcused except for absences due to religious observance or officially approved trips.

II. COVID-19 INFORMATION

FACE COVERINGS ARE REQUIRED

Texas Tech University requires that students wear face coverings while in classes, while otherwise in campus buildings, and when social distancing cannot be maintained outdoors on campus.

SIGNAGE

Be attentive to signage posted at external and some classroom doorways that indicates entry and exit ways, gathering and queuing spaces, and availability of masks and hand sanitizer.

SEATING ASSIGNMENTS

The purpose of assigned seating is to assist in contact tracing, if necessary, and to augment social distancing. Students are expected to sit at a minimum of six feet apart. There will also be an orderly procedure, designed to ensure social distancing, for exiting the classroom.

ILLNESS-BASED ABSENCE POLICY

If at any time during this semester you feel ill, in the interest of your own health and safety as well as the health and safety of your instructors and classmates, you are encouraged not to attend face-to-face class meetings or events. Please review the steps outlined below that you should follow to ensure your absence for illness will be excused. These steps also apply to not participating in synchronous online class meetings if you feel too ill to do so and missing specified assignment due dates in asynchronous online classes because of illness.

1. If you are ill and think the symptoms might be COVID-19-related:

a. Call Student Health Services at 806.743.2848 or your healthcare provider. After hours and on weekends contact TTU COVID-19 Helpline at 806.743.2911.

b. Self-report as soon as possible using the Dean of Students COVID-19 webpage. This website has specific directions about how to upload documentation from a medical provider and what will happen if your illness renders you unable to participate in classes for more than one week.

c. If your illness is determined to be COVID-19-related, all remaining documentation and communication will be handled through the Office of the Dean of Students, including notification of your instructors of the period of time you may be absent from and may return to classes.

d. If your illness is determined not to be COVID-19-related, please follow steps 2.a-d below.

2. If you are ill and can attribute your symptoms to something other than COVID-19:

      a. If your illness renders you unable to attend face-to-face classes, participate in synchronous online classes, or miss specified assignment due dates in asynchronous online classes, you are encouraged to visit with either Student Health Services at 806.743.2848 or your healthcare provider. Note that Student Health Services and your own and other health care providers may arrange virtual visits.

      b. During the health provider visit, request a "return to school" note;
      c. E-mail the instructor a picture of that note;
      d. Return to class by the next class period after the date indicated on your note.

Following the steps outlined above helps to keep your instructors informed about your absences and ensures your absence or missing an assignment due date because of illness will be marked excused. You will still be responsible to complete within a week of returning to class any assignments, quizzes, or exams you miss because of illness.

3. If you have interacted with individual(s) who have tested positive for COVID-19:
Maintain a list of those persons and consult Student Health Services at 806-743-2911 or your primary care provider on next steps.

Do not return to class until you are medically cleared by your Healthcare Provider.

III. UNIVERSITY REQUIRED STATEMENTS

ADA STATEMENT
Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in West Hall or call 806-742-2405.

ACADEMIC INTEGRITY STATEMENT
Academic integrity is taking responsibility for one's own class and/or course work, being individually accountable, and demonstrating intellectual honesty and ethical behavior. Academic integrity is a personal choice to abide by the standards of intellectual honesty and responsibility. Because education is a shared effort to achieve learning through the exchange of ideas, students, faculty, and staff have the collective responsibility to build mutual trust and respect. Ethical behavior and independent thought are essential for the highest level of academic achievement, which then must be measured. Academic achievement includes scholarship, teaching, and learning, all of which are shared endeavors. Grades are a device used to quantify the successful accumulation of knowledge through learning. Adhering to the standards of academic integrity ensures grades are earned honestly. Academic integrity is the foundation upon which students, faculty, and staff build their educational and professional careers. [Texas Tech University ("University") Quality Enhancement Plan, Academic Integrity Task Force, 2010]

RELIGIOUS HOLY DAY STATEMENT

"Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code §11.20. A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. A student who is excused under section 2 may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

DISCRIMINATION, HARASSMENT, AND SEXUAL VIOLENCE STATEMENT
Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination of any kind. Sexual assault, discrimination, harassment, and other Title IX violations are not tolerated by the University. Report any incidents to the Office for Student Rights & Resolution, (806)-742-SAFE (7233) or file a report online at titleix.ttu.edu/students. Faculty and staff members at TTU are committed to connecting you to resources on campus. Some of these available resources are: TTU Student Counseling Center, 806- 742-3674, https://www.depts.ttu.edu/scc/(Provides confidential support on campus.) TTU 24-hour Crisis Helpline, 806-742-5555, (Assists students who are experiencing a mental health or interpersonal violence crisis. If you call the helpline, you will speak with a mental health counselor.) Voice of Hope Lubbock Rape Crisis Center, 806-763-7273, voiceofhopelubbock.org (24-hour hotline that provides support for survivors of sexual violence.) The Risk, Intervention, Safety and Education (RISE) Office, 806-742-2110, https://www.depts.ttu.edu/rise/ (Provides a range of resources and support options focused on prevention education and student wellness.) Texas Tech Police Department, 806-742- 3931,http://www.depts.ttu.edu/ttpd/ (To report criminal activity that occurs on or near Texas Tech campus.)

CIVILITY IN THE CLASSROOM STATEMENT
Texas Tech University is a community of faculty, students, and staff that enjoys an expectation of cooperation, professionalism, and civility during the conduct of all forms of university business, including the conduct of student–student and student–faculty interactions in and out of the classroom. Further, the classroom is a setting in which an exchange of ideas and creative thinking should be encouraged and where intellectual growth and development are fostered. Students who disrupt this classroom mission by rude, sarcastic, threatening, abusive or obscene language and/or behavior will be subject to appropriate sanctions according to university policy. Likewise, faculty members are expected to maintain the highest standards of professionalism in all interactions with all constituents of the university (www.depts.ttu.edu/ethics/matadorchallenge/ethicalprinciples.php).

LGBTQIA SUPPORT STATEMENT
I identify as an ally to the lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA) community, and I am available to listen and support you in an affirming manner. I can assist in connecting you with resources on campus to address problems you may face pertaining to sexual orientation and/or gender identity that could interfere with your success at Texas Tech. Please note that additional resources are available through the Office of LGBTQIA within the Center for Campus Life, Student Union Building Room 201, www.lgbtqia.ttu.edu, 806.742.5433."