

San José State University
Department of Design
dsIT 109, Object Design, Spring, 2019

Course and Contact Information

Instructor:	Virginia San Fratello
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Office Hours:	M 11:00 am -12:00 pm W 11:00 am-12:00 pm
Class Days/Time:	M/W 12:00 pm-2:50 pm
Classroom:	IS 240

Course Description

Architecture, in this seminar, will be defined as the complex or carefully designed structure of something. The carefully designed structures that emerge from this studio will be made of 3D printed bio-plastics, polymers and clay. Students will have the opportunity to explore the creation of modular, self-connecting, 3D printed componentry to create proposals for larger surfaces and that examine the relationship between part and whole.

Students will grow concepts for large structures of something from smaller 3D printed blocks, bricks, or textiles. The beauty of a large 3D printed structure built of many smaller non-standard or customized components is that each part can be individually fine tuned to respond to the geomemetic particularities of a complex form. In this case, each component can acknowledge its position in space relative to the whole, by encoding the instructions directly onto the block and to external forces such as climate, solar orientation, and adjacent programming requirements. The consideration of context, sensorial, atmospheric or geologic conditions will be encouraged as a means of shaping the components. Because smaller parts are the scale of the hand, such as the bricks mankind has used historically to construct buildings and cities, they are easily handled and assembled, and also do not require special skills or tools for assembly, despite the complexity of the final outcome of an exuberant 3D printed structure. By 3D printing small, fundamental building blocks, the seminar will build on craft traditions of the past, while simultaneously exploring the potential that the emerging technology of 3D printing has to offer.

Parallel to the investigation into 3D printed componentry, students will also have the opportunity to explore alternative, radical and new methods for post processing their 3D printed components and will be asked to question the finish of the part as it comes directly off the printer. For example, can a 3D printed part be flocked or coated with a smog eating paint? Can it be aromatic? Can plants grow on it?

The ultimate goal of the semester will be to craft a new paradigm for the fabrication of things, one that allows the designer to engage directly with a manufacturing process that will one day be used to construct the bricks, blocks, and tiles that make up the complex structures of our built environment.

Learning Outcomes

At the end of this course students will understand:

Design thinking skills

- Ability to raise clear and precise questions, use abstract ideas to interpret information, consider diverse points of view, reach well-reasoned conclusions, and test them against relevant criteria and standards.

Moving from digital to analogue

- Expose students to digital fabrication and rapid prototyping.
- How to fabricate a physical model from a digital 3d model using techniques such as 3D printing, contouring, unrolling or unfolding.
- How to test structure, form and material through physical modeling and construction.

Material Processes

- Understanding of the basic principles and appropriate application and performance of construction materials, products, components, and assemblies, including their environmental impact and use.
- Physically working through a material process such as patterning, molding or casting to fabricate a finished product.

Visualization

- How to express their ideas clearly through visual media (digital drawings and prototypes), the production of presentation drawings across a range of appropriate media and to produce integrated contract documents including drawings, schedules, and specifications appropriate to project size and scope.

Required Reading

Printing Architecture: Innovative Recipes for 3D Printing by Ronald Rael + Virginia San Fratello

Recommended Reading

Printing Things by Dries Ver Bruggen

Digital Materiality by Fabio Gramazio + Matthias Kohler

Library Liaison

Aliza Elkin

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Liaison to the Department of Design
San Jose State University

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

The course is organized around lecture and lab work: lectures will introduce topics and assignments and provide an overview of issues and outline the design principles and communication concepts that are expected to be investigated. Labs will be a period of focused exploration of design issues and communication skills. Finished projects and work in progress will be presented and discussed during each class session to make important points about design. Each pin up will be graded. It is expected that your work will be printed out and pinned up within the first 15 minutes of class. If it is not you will receive a grade of 0 for that assignment.

Your final grade for this class will be based on class participation in reviews and labs and the successful completion of assignments. The assignment grade will be based on a set of criteria including the thoughtfulness and originality of the concept, rigorous and iterative experimentation, the application of the design principles you have learned, and the time and care you have invested in making models, final objects, renderings and presentations.

<u>Breakdown:</u>	100 %
Assignment 1:	30%
Assignment 2:	30%
Assignment 3:	30%
Participation:	10%

Class Participation will be based on preparedness for in class desk critiques and pin ups and your role in contributing to the overall dialogue.

Grading Percentage Breakdown

A = 100% to 95%
A minus = 95% to 91%
B plus = 91% to 87%
B = 87% to 85%
B minus = 85% to 81%
C plus = 81% to 77%
C = 77% to 75%
C minus = 75% to 71%
D plus = 71% to 67%
D = 67% to 65%
D minus = 65% to 61%
F = 61% to 0%

A- Excellent. Indicates work of a very high character; the highest grade given. This grade is reserved for work that shows leadership and inspiration, demonstrating significant insight developed to its fullest extent and presented with exquisite craftsmanship.

- B- Good. Indicates work that is definitely above average, though not of the highest quality. This work shows thorough exploration and development, and is well presented with good craftsmanship, but it may not rise to the highest level of excellence.
- C- Fair. Indicates work of average or medium character. Work in this category demonstrates complete fulfillment of the stated requirements and an understanding of the issues covered, but does not exceed the expectations of understanding, development, or execution.
- D- Pass. Indicates work below average and unsatisfactory. The lowest passing grade. Though work may meet the minimum requirements, it lacks depth, development or is unsatisfactorily crafted.
- F- Fail. Indicates work that the student knows so little of the subject that it must be repeated in order that credit may be received. Work in this category may be unfinished, unimaginative, underdeveloped or poorly executed, and shows minimal understanding of issues.

Required Materials:

You will need a laptop that is powerful enough and meets the minimum requirements to run the appropriate software for this class.

SOFTWARE:

Modo 12
Meshmixer
Slic3er
Photoshop
Adobe Illustrator
Indesign
Quicktime

You may purchase the student version of MODO 12 online at:
<https://www.thefoundry.co.uk/industries/education/>

1. Click on student and graduate program
2. Click on apply for a student license
3. Fill out the request
4. A representative from the foundry will email you and provide subsequent instructions. It usually takes about a week to get Modo up and running on your laptop.

You MUST have the educational or trial version of MODO installed on your computer by the second day of class.

Photoshop and Illustrator are part of the Adobe Creative Suite and are available to SJSU students.

Quicktime is free and can be downloaded from the internet.

You will use these software applications for the rest of your academic career and newer versions and variations on them as you move into the profession. They are mandatory and no designer can expect to be gainfully employed without working knowledge of these tools today.

Students will also be responsible for purchasing material as required for assignments, materials may include: pens, pencils, paper, wood, cement, acrylic, adhesives, plastics, foamcore, plaster, fastening hardware, aluminum, wax prints, cornstarch prints and other materials suitable for model making, high quality paper for print outs, and professional printing services.

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Classroom Protocol

Teaching is a two-way dialogue. Attendance is expected at all class sessions and the student’s presence throughout the entire class time is required. Whenever possible, the professor should be notified in advance of a student’s inability to attend a class. In the event the professor is late for class, students are authorized to leave after a half hour wait. It is important to be on time and to be present. It is possible to produce “A” work in the class yet receive a lower grade due to poor class participation and attendance. Students must be present for in class critiques, students who arrive late will not be allowed to present.

If you miss a class, It is your responsibility to find out what you missed BEFORE the next class. Technical demos and lectures will not be repeated for students who miss a class; Projected critique dates will given to you in advance; however, in some instances these may change do to extenuating circumstances, and it is your responsibility to find out about any announcements made in class, by communicating with your classmates.

Deadlines will be made available to you in class. Any work not turned in on the date it is due is considered late. Ten percent will be deducted from the grade for every class period it is not turned in. Special circumstances will be taken into consideration (e.g. Illness, court appearance, death of a relative.) All assignments must be completed and turned in to receive a passing grade for the class.

The instructor reserves the right to alter assignments and change project due dates with sufficient notice to the students.

University Policies

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at <http://info.sjsu.edu/static/catalog/policies.html>. Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/) at http://www.sjsu.edu/provost/services/academic_calendars/. The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at <http://www.sjsu.edu/aars/policies/latedrops/policy/>. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at <http://www.sjsu.edu/advising/>.

Consent for Recording of Class and Public Sharing of Instructor Material

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), <http://www.sjsu.edu/senate/docs/S12-7.pdf>, requires students to obtain instructor’s permission to record the course:

- “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”
- “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy S07-2](http://www.sjsu.edu/senate/docs/S07-2.pdf) at <http://www.sjsu.edu/senate/docs/S07-2.pdf> requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](http://www.sjsu.edu/studentconduct/) is available at <http://www.sjsu.edu/studentconduct/>.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. [Presidential Directive 97-03](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the [Accessible Education Center](http://www.sjsu.edu/aec) (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

Accommodation to Students' Religious Holidays

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See [University Policy S14-7](http://www.sjsu.edu/senate/docs/S14-7.pdf) at <http://www.sjsu.edu/senate/docs/S14-7.pdf>.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	Jan. 28 Jan. 30	-Project 1: Printing Architecture Assigned -modo software tutorial -slic3er software tutorial -modo tutorial
2	Feb. 04	- desk critiques and evaluation of first 3D printed tile

Week	Date	Topics, Readings, Assignments, Deadlines
	Feb. 06	- desk critiques - evaluation of first four tiles
3	Feb. 11 Feb. 13	- digital modeling + test 3D printing - Pin UP
4	Feb. 18 Feb. 20	- 3D printing - 3D printing
5	Feb. 25 Feb. 27	-3D printing -3D printing
6	Mar. 04 Mar. 06	- Final Presentation - Project 2: Paste Extrusion Project Assigned -potterware tutorial
7	Mar. 11 Mar. 13	- extruding - Field trip
8	Mar. 18 Mar. 20	- extruding - extruding
9	Mar. 25 Mar. 27	-extruding - Final Presentation
10	Apr. 01 Apr. 03	Spring break Spring break
11	Apr. 08 Apr. 10	- Project 3: Post Processing Assigned - testing
12	Apr. 15 Apr. 17	-testing - testing
13	Apr. 22 Apr. 24	- testing - Pin Up
14	Apr. 29 May. 01	-fabrication -fabrication
15	May 06 May 08	-assembly -assembly
16	May 13	- final ‘Post Processed’ installations due
Final Exam	May 17	9:45 AM