

San José State University
Department of Design / Industrial Design Program
DSID 128, Advanced Projects in ID, Sect. 01, Spring
2020

Instructor:	Jim Shook
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Office Hours:	Mon, Wed 11am
Class Days/Time:	M W 12:00-2:50pm
Classroom:	Art 205
Prerequisites:	DSID 125A; DSID 121 (Corequisite); DSGN 127
Course Fees:	A percentage of your fees are used in the maintenance of the prototyping facility equipment. The Department of Design requires that Industrial Design students attend and pass the shop safety orientation at least once each year. A shop test date will be reserved within the first two-three weeks of the term. You must provide proof of enrollment and a receipt from the bursar's office that you have paid the required \$20 shop fee to fund #62089 prior to taking the test.

Canvas Course Management Website & Course Format

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This course uses a hybrid method of teaching. A hybrid course means that there are components of the course that are done in the classroom and other components that require using the online course management system. Course materials such as the syllabus, assignment handouts, grading, etc. may be found on the DSID 128 course Canvas website. You may find your link to this website on MySJSU, along with your login/password info. You are responsible for regularly checking with the messaging system in Canvas for course updates, assignments, etc. All class correspondence and grading will also be managed through the class Canvas site. If you do not check Canvas often, you should set up your email forwarding to forward all class correspondence to your preferred email address. You must have access to a computer and the internet to be able to access the Canvas site. You may also use a tablet or your phone. Some assignments will be required to be turned in on Canvas, in which case you will need to have access to some basic software such as MS Office (MS Word) or some writing software, Adobe Acrobat, and basic scanning software for scanning sketches to upload to the assignment portal. See [University Policy F13-2](http://www.sjsu.edu/senate/docs/F13-2.pdf) at <http://www.sjsu.edu/senate/docs/F13-2.pdf> for more details.

Course Description

The Advanced Projects in ID Studio (DSID 128) is intended to build upon and reinforce your previous coursework experience by emphasizing the manner in which you are able to design a product within strict required parameters. We will therefore focus on the further development of your design skills and process as it applies to design in today's professional product development environment where you are required to design for an existing or required design idiom. In most cases, Industrial Designers are working for a corporation or for consulting offices that are working for corporations. These corporations have already defined their market strategy and the designers are required to design products that support and fit within the strict market approach that the corporation has researched and defined. As an advanced design student, you will be required to learn to be creative within client defined constraints.

Course Goals:

Student Learning Objectives

This course will focus on design theories, methods and techniques used by product designers working with complex product design, appropriate brand/visual cohesiveness, a variety of technologies, and an understanding of lifestyles. It will stress application of all the knowledge you have gained while a student in this program including, but not limited to: design theory, persuasive presentation, quality and craftsmanship, ergonomics, materials and manufacturing processes used in mass-manufacturing processes, mechanical complexity, invention, production techniques, human factors (physical and behavioral), ethnography, surveys, detailed design development techniques, sustainable design strategies, sketching, model making, good aesthetics principles, and use of a variety of software and hardware tools.

Class assignments will include readings from a variety of sources, videos, possible guest lectures, Quizzes, and design of a product solution for the defined problem. Reading from the assigned readings and other sources from Canvas may be required each week and will be reviewed and applied in class through discussions and exercises.

Your applied design project **MUST** meet the following criteria:

- 1) Design within the strict parameters set out by your previous research and resulting design requirements but be creative and innovative within those parameters.
- 2) Design must have sufficient detail of functional components that it is clear that the designer has seriously considered the engineering and manufacturing requirements.
- 3) Designed to be manufactured and priced competitively.
- 4) Aesthetically pleasing and appropriate for the product and the culture.
- 5) Functional, and ergonomically superior.
- 6) Must improve the quality of life and add psychological or functional value to the lives of the target market.

Course Learning Outcomes (CLO)

On successful completion of the course students shall be able to:

- (LO1) Identify and demonstrate the role of the designer in a professional setting.
- (LO2) Create a design project from idea through to final design in a highly refined manner during all phases of the project.
- (LO3) Demonstrate systematic thinking through of complex problems and systems and apply industry standards of ergonomics, sustainability, user research, and manufacturing processes to a project.
- (LO4) Practice problem identification and discovery and apply empathic design methods.
- (LO5) Demonstrate advanced problem solving skills and tools, engage in active learning in and outside the classroom, and apply lessons learned to the project. Participation is key to active learning and students will demonstrate the methods associated with active learning in a creative environment.
- (LO6) Know the role of the designer in scenario development in the design industry.
- (LO7) Apply physical and behavioral ergonomics and human factors and successfully use scientific methods to find the most appropriate solutions.
- (LO8) Perform advanced critical and technical writing skills as applied to design briefs and documentation of project work.
- (LO10) Produce clear and compelling communication of ideas in 2D, 3D, and 4D formats.
- (LO11) Apply the principles of time management through the use of scheduling tools.
- (LO12) Evaluate appropriate aesthetics and brand and apply to the entire design project.

Course Project Deliverables

- 1) User, cultural, and technical research as related to environment and product. Includes competitive product research, empathic research, materials research, etc. Review, research and analysis that results in a Design Problem

Statement and Design Goals and Guidelines. These will have come from your DSID 121 class the previous semester.

- 2) Sketches and renderings as required and/or scheduled by you or instructor
- 3) Sketch models throughout the semester as part of phase deliverables and required sketches each week.
- 4) By Mid-Term: Multiple full-scale (when appropriate) iterative design mock-ups and a full-scale functional prototype for thorough ergonomic and usability testing.
- 5) Technology, Materials, and Cost Specifications in a Bill of Materials (BOM).
- 6) Final 3D Functional and 3D Appearance model of final solution (might be two models, one functional and one appearance)
- 7) Final CAD rendering of product alone and an in-context rendering with product being used.
- 8) Final exploded view and section views of assembled components of the product with part names and manufacturing specifications in a clear and understandable visual presentations showing how product is manufactured, assembled, and deployed for use in a step-by-step process.
- 9) A minimum 2-3 minute video that shows the development journey of the project WITH the use of the prototype in action. The goal here is not to create an ad for your product, but to share your design experience, show the functional results, and demonstrate how the product ACTUALLY works. Focus is on the product, not the research. This is a technical video about how the product works, not a marketing or PR video. Show how you validated the effectiveness of the design.
- 10) A final visual presentation (digital) will take place during the last two weeks of class. About 2 minutes in duration.
- 11) A digital process book, well organized, well crafted, and with a Table of Contents, Section Dividers, and submitted at the Final Exam date.

Required Texts/Readings

Textbook

A reference textbook (not required) is:

Ulrich, K. and Eppinger, S. *Product Design and Development*. (5th or 6th Edition)
McGraw-Hill, New York, 2012. ISBN 978-0078029066 (6th Edition), ISBN 978-0073404776 (5th Edition)

- a. You can get an international 5th edition here:
(<http://www.abebooks.com/9780073404776/Product-Design-Development-5th-Edition-0073404772/plp>). It is no different than the US edition and it costs significantly less (\$25 vs \$141). Please make sure you get the 5th Edition or 6th Edition only as they are significantly different from earlier editions.

Note: This book will be used extensively as a basis for the design process in this course. It heavily favors a quick concept/design/build/test process and provides information and methods to do this successfully. The textbook will be supplemented by other design process examples that are posted on Canvas.

Other readings are located on Canvas.

Required reading is:

Tim Tan book on product aesthetics. There will be weekly quizzes from this book during the first half of the semester.

Other recommended reading is:

1) Hanington, B., Martin, B., *Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions*.
Rockport Publishers, Beverly, MA, 2012. ISBN 978-1592537563.

Boradkar, P. *Designing Things: A Critical Introduction to the Culture of Objects*. Berg Publishers, New York, 2010. ISBN 978-1-84520-426-6

Buchanan, R. *The Designed World: Images, Objects, Environments*. Berg Publishers, New York, 2010. ISBN 978-1-84788-586-9

Caplan, R. *By Design. Why There Are No Locks On the Bathroom Doors In The Hotel Louis XIV And Other Object Lessons*. Fairchild Publications, New York, 2005. ISBN 1-56367-349-5

Fukasawa, Naoto. *Naoto Fukasawa*. Phaidon Press, 2007. ISBN 978-0714845869.

Laurel, B. *Design Research: Methods and Perspectives*. MIT, Cambridge, 2003. ISBN 0-262-12263-4

Richardson, A. *Innovation X: Why a Companies Toughest Problems Are Its Greatest Advantage*. Jossey-Bass, San Francisco, 2010. ISBN 978-0-470-48219-3

Rogers, E. *Diffusion of Innovations*. Free Press, New York, 2003.

Sennett, R. *The Craftsman*. Yale University Press, New Haven, 2008. ISBN 978-0-300-11909-1

Course Fees

Course fees collected for DSID 128 (\$45) will be used to supplement some costs of modeling supplies for this class and for running the ID Labs and maintaining equipment. Each student has access to a total of 3 cubic inches of 3D printing consumables for their project models. Each student has access to be able to print 8 linear feet of large format printer paper for presentations.

Required Materials List

Materials that will be required for this course will vary depending upon your specific project that are not covered by Course Fees:

- 1) One ream (500 sheets) of 8.5" x 11" copy paper: \$15
- 2) Various mock-up materials: foam core sheet, cardboard, modeling clay, light-weight foam, tape, etc. \$100
- 3) Some harder density foam, modulan/renshape, or casting materials for

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- the final model (some can be bought at the Spartan Bookstore): \$160
- 4) 3D Printer consumables will be provided up to 3 cubic inches \$50
 - 5) of volume. Any material after that will be charged to the student. See Student Assistant for more information about how to submit files, calculate and pay fees.
 - 6) Plastic (acrylic, styrene, polycarbonate, PVC, etc.): \$50
 - 7) Pens, pencils, masking tape, measuring tools for working in shop \$50
 - 8) Standard set of drill bits for working in shop \$30
 - 9) Paint for model: \$75
 - 10) Ink cartridges for printing: \$120
 - 11) A variety of functional prototyping materials that may include: \$150
Mechanical prototyping materials like LEGO or similar, batteries, wiring, soldering equipment, metal, high density plastic, etc.

The total cost of these materials is estimated to be between: \$500-750 USD

Shop Test

The Department of Design requires that Industrial Design students attend and pass the shop safety orientation at least once each year. You are responsible for viewing the [Shop Safety Video](#) on your own as it is posted online. The shop test date will be announced the first day of class and is listed on the syllabus. That will be the only date that you will be able to take the shop test for this course so make sure you have studied up and paid your shop test fee at the Bursars Office before that date. You must provide proof of enrollment and the original receipt from the Bursar's Office that you have paid the required \$20 shop fee to fund #62089 prior to taking the test.

Library Liaison

Monika Lehman, Liaison Librarian for Design Department
Email: Monika.Lehman@sjsu.edu
Phone: 408.808-2657

Classroom Protocol

Active participation in class activities is a significant factor in a student's success in the Industrial Design program. Active learning facilitates mental growth, skill enhancement, creates a life long learner and improves the goals of becoming a good designer. Students are expected to be on time to class and when a class critique is planned, work is to be taped/pinned up to the walls by 10 minutes after the official start of the class as we will make all efforts to begin the critique at that point. Arriving late to class without prior arrangement and approval from the professor is considered disruptive. If the student cannot be in the classroom by the start of class, please do not interrupt the class in session by entering the classroom. If a student encounters any problems that inhibit their ability to participate in the class, please provide as much advance notice as possible to the instructor so that he/she may respond and inform the student in a timely manner. Students are to be respectful of the professor and their peers and any disruptive activities in the classroom will result in the student being asked to leave the class. Students are expected to leave the classroom in a clean condition at the end of each class meeting so that the next class has an organized, clean room waiting for them.

Cell phones, tablets, and even laptops can be disruptive and inconsiderate to your classmates and the instructor. Unless it is being used for a class activity, please turn off all electronic devices that can potentially disrupt class. ***Phones are NOT permitted in this class*** and you will be asked to turn off and store your phone at the start of each class. If you disrupt or withdraw from class activities due to your inability to silence and ignore any of these devices, it will count against the participation portion of your final grade and you may be asked to leave the classroom. Additionally, talking in class during a lecture is considered disruptive to the class and will adversely affect the participation grade and you may be asked to leave the classroom. If emergency personal issues (documented family, medical, etc) require you to leave your phone on, please make arrangements with the instructor prior to and *in advance* of the start of class.

Assignments and Grading Policy

Students will be engaged in lectures, research and design activities, and lab time during class meeting times and they will be assessed on engagement in those activities in their Participation grade (LO 5). Students will have homework

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assignments to do outside of class (up to 12 hours per week) that include reading, sketching in their sketchbook, and drawing and concept development assignments (LO 1-6). Students will be required to turn in a mid-term body of work done to date, along with keeping up to date on uploading all assignments to Canvas for grade assessment (LO 7-12). You will be required to turn in your final project on the final presentation date (LO 7-12). The assigned final will be the turning in of your project process book AND your project laid out in your portfolio format in both printed hard copy format in professors' office and digital format on Canvas (LO 1-12). Grading will follow the standard SJSU A-F system.

All grades are assessed on the following three criteria: Quality, Effort, and Completeness. Each assignment, presentation and deliverable will be graded on these three criteria, with each criteria holding equal value (33.33%).

A+, A, A- / 100+ - 91% / Excellent
B+, B, B- / 90 – 81% / Above Average
C+, C, C- / 80-71% / Average
D / 70-61% / Below Average
F / Below 61% / Failure

Grading is weighted during the semester as follows:

Iteration and Design Process (LO 2,3,5,7,10)	25%
Class Participation (LO 5):	15%
Midterm Presentation and Deliverables (LO 8-12):	20%
Final Critique, Presentation, and Project Deliverables (LO 11-12):	20%
Final Exam: Process Book (LO 3, 8, 10-12):	20%

All assignments are due on time. ***No late work is accepted without documented justification.*** If you miss the Canvas deadline for uploading a project deliverable, you will receive a failing grade for that deliverable, however you will still receive feedback on the submission, but only at the next available time that the professor has. Project work for in-class critiques must be 100% complete and pinned up on time in order to receive in-class feedback and anything more than a failing grade.

Extra credit is not possible in this course as the workload is significant enough. The Participation grade in this course will be assessed through your engagement in Activities/Exercise sessions, discussions in class, online engagement through Canvas, and critiques. Actively engaging and exhibiting life-long learning skills during class are the mode by which participation is assessed.

Student Technology Resources

It is a requirement for ID students to have their own computer with the required software (Adobe CS, Solidworks, MS Office), and it is required for DSID 125A that all ID students have a large format printer (11"x17" or 13"x19"). A wide variety of audio-visual equipment is available for student checkout from [Media Services](#) located in IRC 112. These items include digital and VHS camcorders, VHS and Beta video players, 16 mm, slide, overhead, DVD, CD, and audiotape players, sound systems, wireless microphones, projection screens and monitors. The ID Program will provide access to the large format printer for critiques and presentations. Students will be given an 8 linear foot allotment of paper for this course (enough for 1 draft and 1 final print). Any additional needs for printing can be accommodated by payment through the IDSA Student Chapter or going to Plotter Pros (<http://www.plotterpros.net/index.shtml>) in San Jose.

Adobe Creative Suite licenses is available through the SJSU Adobe software program for faculty, staff, and students. Students can access Adobe Creative Suite 6 Design and Web Premium, and should be able to download it from <http://its.sjsu.edu/services/software/adobe/index.html>.

For access to a Solidworks License, send an email to the professor of this course or your Major Advisor, from the email address you wish to have the license listed under, and the professor will email you the instructions within 48 hours.

University Policies

SJSU's Office of Graduate and Undergraduate Programs maintains university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. You may find all syllabus related University Policies and

resources information listed on [GUP's Syllabus Information Web Page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>.

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Course Schedule

Schedule is subject to change with fair notice (one class period) in class or via Canvas.

Work Product Guidelines:

Students are expected to produce a considerable amount of sketching artifacts in 2D, 3D and 4D form throughout the semester (on paper, in the form of mock-ups, progressive test prototypes, refined models, renderings, and final models/prototypes). To be effective for this type of project it is expected that each student produce no less than 200-300 sketches during the term (that works out to an average of 30 sketches per week from weeks 2-12). Design projects require a significant amount of experimentation and exploration during the first Phases of the project, in order to gain insights that guide final project direction. To help with each individuals "design process methods" a weekly sketch requirement will be assigned, as a way to assist in time management for the project.

Week	Date	Topics, Readings, Demos, Assignments, Deadlines
1	M 1/27	Course Intro and Discussion, Review Last Semester <i>Lecture:</i> I.D. Process and levels of sketching related to phases of the design. <i>Lecture:</i> Aesthetic Goals and Design Elements & how to use them to achieve aesthetic goals. Class Preparation for Monday assignment: Assemble your Design Criteria list (from research). Functional, Aesthetic, Business goals. <i>Group Activity:</i> Review projects and plan revisions <i>Reading:</i> Tim Tan Book, pages 3 through 14
	W 1/29	Revise Final 10 Design Directions Quiz#1: Tim Tan Book, Pages 3 through 14 <i>Lecture:</i> Review First, Second, Rhythmic Third Read Design

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		<p>Assignment #1: Re-do Final 10 Concept Renderings. (Full color & tight). Assure alignment with research goals. In Class: One on One reviews</p>
Wk 2	<p>M 2/3</p> <p>W 2/5</p>	<p>Preparation for Final 3 <i>Due:</i> Assignment #1 (Final 10 concept renderings) <i>Lecture:</i> Understanding design criteria and how to use it to make decisions. <i>Activity:</i> Group collaboration and review of Final 10 renderings in preparation of selecting 'Final 3' Assignment #2: Preliminary layout (thumbnails) of each of final 3 renderings. (thumbnails). <i>Reading:</i> Tim Tan book pages 15 through 37</p> <p>Final 3 Directions <i>Due:</i> Assignment #2 (Thumbnails of final 3 renderings) <i>Lecture:</i> Sketching level for final 3 renderings. <i>Activity:</i> Group review of Final 3 Thumbnails Assignment #3: Final Renderings of Final 3 Design Directions Quiz #2: Tim Tan book pages 15 through 37.</p>
3	<p>M 2/10</p> <p>W 2/12</p>	<p>User Interviews and Decision for Final Design <i>Due:</i> Assignment #3 (Final 3 Design Directions Renderings) <i>Lecture:</i> User Interviews <i>Reading:</i> Tim Tan book pages 39 through 51 In Class: Group discussion & feedback on User Surveys Assignment #3: Final Render</p> <p>Design Lock and Rendering. <i>Lecture & Discussion:</i> User "story", User Scenarios (day in the life). Image Quiz #3: Tim Tan book pages 39 through 51</p>

4	<p>M 2/17</p> <p>W 2/19</p>	<p>Session 6: Final Renderings Due: Assignment #3 Final Render <i>Lecture & Discussion: Next step....Test, Refine, Document</i> <i>Reading: Tim Tan book pages 53 - 57</i> <i>Activity: Work in class</i></p> <p>Session 7: Component layouts Assignment #4 Preliminary exploded and section views <i>Activity: Lecture on Creativity based on focused goals.</i> Quiz #4: Tim Tan book pages 53 - 57</p>
5	<p>M 2/24</p> <p>W 2/26</p>	<p>Component Models <i>Due: Assignment #4 Test and Refine (Prelim Exploded/sections)</i> <i>Assignment #5: Development and test models. (components & packaging development) Due Mar 4</i> <i>Lecture: Development Test Models</i> <i>Activity: Group review of test and refine</i> <i>Reading: Tim Tan book Pages Pgs 59 - 67</i></p> <p>Component Models <i>Lecture: Combining Science, Art, Business</i> Quiz #5: Pages Pgs 59 - 67 <i>Activity: Group collaboration on Art, Science, Business</i></p>
6	<p>M 3/2</p> <p>W 3/4</p>	<p>Orthographics and Prep for Midterm <i>Due: Assignment #5 (Component and packaging models)</i> <i>Lecture & Discussion: Prep for midterm</i> <i>Activity: Group review of component and packaging models</i> <i>Assignment #6: Orthographic Drawings and preparation for midterm</i> Reading: Tim Tan book Pages 73 - 89</p> <p>Prep for Midterm <i>Due: Assignment #6: Orthographic Drawings and preparation for midterm</i></p>

		<i>Lecture: Requirements for Midterm Presentations</i> Quiz #6: Tim Tan book Pages 73 - 89
7	M 3/9	Midterm Presentations Midterm Presentations Group 1
	W 3/11	Midterm Presentations Group 2
8	M 3/16	Final Orthographics <i>Activity:</i> Work in class <i>Lecture:</i> Making a plan for building your final model <i>Reading:</i> Tim Tan book Pages 91 - 109
	W 3/18	Due: Physical Model Plan Quiz # 7: Tim Tan Book Pages 91 - 109
9	M 3/23	Make Model <i>Activity:</i> Work on your project in class and meet with instructor
	W 3/25	Make Model <i>Activity:</i> Work on your project in class and meet with instructor
10	3/30, 4/1	<i>SPRING BREAK</i>
11	M 4/6	Make Models <i>Activity:</i> Work in class and get instructor feedback
	W 4/8	Assignment: Start CAD Modell (if appropriate) Make Models <i>Activity:</i> Work in class and get instructor feedback
12	M 4/13	Make Models <i>Lecture:</i> Design ethics and legal implications <i>Activity:</i> Work in class <i>Assignment:</i> 50% complete CAD model
	W 4/15	Make Models <i>Activity:</i> Work in class <i>Assignment #15A:</i> CAD model 75% complete

13	M 4//20 W 4/22	Make Models <i>Due: Assignment #15A</i> <i>Lecture: CAD models vs physical models</i> <i>Activity: Work in class</i> Models Due
14	M 4/27 W 4/29	Prepare Final Presentations Prepare Final Presentations
15	M 5/4 W 5/6	Final Presentations Group #1 <i>Final Presentations Group #2</i>
16	M 5/11	<i>Debrief semester and Prep for Sr. Show.</i>