**IDSN 524: Physical Product Design**
Units: 4
Fall 2024
**Day: Tuesday**
**Time: 5:00pm-7:50pm**

**Location:**
**Iovine and Young Hall**
3780 Watt Way
Los Angeles, 90089
**Room: 110**

**Instructor:**
**Grant Delgatty**
Office Hours: Email for appointment
Contact Info:
**Grant – delgatty@usc.edu**

**IT Help:**  https://iovine-young.usc.edu/ait/index.html
**Hours of Service: 8:30am - 5:00pm**
**Contact Info:** iyhelp@usc.edu, 213-821-6917

## Course Description

IDSN 524: Physical Product Design is an introductory course that teaches students the fundamentals of designing and developing challenge-based consumer product solutions. The course will utilize an expedited process of learning how to research market opportunity, identify specific consumer needs and pain points through human centered design methodologies, brainstorm and discern a range of ideas, quickly and clearly visualize concepts, create iterative low and medium fidelity prototypes to validate with consumer feedback, and utilize 3D modeling, 3D printing and automated computer numerical control (CNC) methodologies to develop final product solutions.

## Learning Objectives and Outcomes

Students will be able to demonstrate:

- An understanding of the fundamentals to developing desirable, feasible, and viable consumer product solutions.
- An ability to discern consumer pain points / problems with the competition and create compelling and feasible solutions to address these areas of opportunity.
- Development in skills relating to creative problem solving, rapid visualization and ideation, and techniques in how to create both low and medium fidelity prototypes.
- An understanding of 3D modeling techniques as well as 3D printing and/or CNC fabrication
- A familiarity with human centered design principles and the iterative process of creating multiple prototypes based on user insights and feedback.
- An ability to evaluate their work and that of their peers in a critical manner

**Prerequisite(s):** none.

**Co-Requisite(s):** none.
**Concurrent Enrollment:** none.
**Recommended Preparation:** Students should have a basic to proficient understanding of Adobe Creative Suite, Keynote and/or PowerPoint, and although not necessary, some basic experience with 3D CAD modeling is beneficial (i.e. - Shapr3D, Solidworks and/or Fusion 360).

## Course Notes

IDSN 524: Physical Product Design is a studio-based course which very closely mimics the actual work environment of a design studio. The format of the course is highly collaborative and primarily critique based. Learning objectives will come from weekly homework assignments and the feedback of both the professor(s) and fellow classmates. It is expected that students will engage in dialogue during class critiques, and a portion of their grade will be based on their ability and willingness to do so.
This course is for a letter grade.

## Technological Proficiency and Hardware/Software Requirements

Students should have a basic to proficient understanding of Adobe Creative Suite, Keynote and/or PowerPoint, and although not necessary, some basic experience with 3D CAD modeling is beneficial (i.e. - Shapr3D, Solidworks and/or Fusion 360). Additional technology support links: Zoom information for students, Brightspace help for students, Software available to USC Campus

## HOW TO PURCHASE SOFTWARE AT THE DISCOUNTED ACADEMY RATE

The following software used in this course are available for purchase online through the USC Iovine and Young software catalog at the Academy discounted rate:

| Software | IYA Short-Term License at USC Bookstore |
|---|---|
| **Adobe Creative Cloud** | $75 2019–2020 annual license |
| **Solidworks** | $35 semester license |

To purchase:
- Visit: https://commerce.cashnet.com/IOVINE
- Select the software license(s) you would like to purchase by clicking "View Details" or the software title, and make your purchase
- You will receive an order confirmation receipt at the email address you provided
- You will be notified by email when the software license has been activated

If you have any questions about this process, please do not hesitate to contact Academy IT Support at iyahelp@usc.edu.

## Optional Readings and Supplementary Materials
**- The Design of Everyday Things** / Donald Norman
**- Change by Design** / Tim Brown
**- Emotional design: why we love (or hate) everyday things** / Donald A. Norman
**- Research Methods for Product Design** / Alex Milton; Paul Rodgers

## Description and Assessment of Assignments
Homework will be weekly assignments presented and/or uploaded digitally each week to a shared Miro virtual workspace, with feedback provided in the form of critique from the professor and fellow classmates. Students will work in teams to create product solutions for a chosen domain topic by going through a process of analyzing the competitive landscape to determine blue ocean opportunities, determining design criteria to address these opportunities, developing initial ideas through brainstorming techniques and ideation sketches, developing initial low-fidelity prototypes, utilizing user feedback to iterate on initial concepts, and creating 3D generated medium fidelity prototypes based on this feedback.

The final assignment will be an individual deck demonstrating the process utilized during the semester. This deck should be well designed and should showcase all aspects of the process you took in developing your final product solution (i.e. - include market research, user profiles, opportunity analysis, problem/ opportunity statement, ideation, and prototype iterations). This deck should be no more than 10 to 15 pages long and should be formatted as a PDF which is no more than 15MB, so it can easily be emailed and viewed by potential employers / interested parties.

Class time may consist of the entire class collectively participating in a large group critique, or the teams may be broken out to have in-class studio time while the instructor(s) give individual critique and feedback to other teams.

Students are responsible for all assignments, including homework, in-class work, critiques, presentations, demos, readings, process documentation, and archiving work. It is the student's responsibility to obtain missed work and information missed if absent. As IDSN 524 is a studio-based class, information is exchanged in group discussion and may not be imparted through handouts or notes, therefore it is critical for students to attend class and be on time to succeed.

## Participation
Both giving and receiving feedback are critical to your success in the class; therefore, your participation grade is based on your active involvement in class and critiques.

Unless otherwise specified, all instruction will be given in-person during class. It is expected that if a student is late or absent from a class, that the student shall follow up with the professor to determine what information was covered.

## Grading Breakdown

Projects will be graded based on adherence to given guidelines, attention to craft, and overall appropriateness. Taking initiative, progression, and follow-through will also be considered.

Grades will be assessed according to a point system based on the following:
- Competency in key concepts
- Adhering to prescribed volume of work
- Effort/range of exploration
- Process and methodology
- Presentation/craftsmanship
- Participation in critiques

**A**      **Exceptional** - Going above and beyond with exemplary work both quantitatively and qualitatively.

**A-**     **Excellent** – Meeting all homework requirements with a very high quality of what's expected with regard to content, creativity, attention to detail and craftsmanship.

**B+**     **Very good** - Completing all assignments with a high level of proficiency but lacking in some areas of competency.

**B**      **Good** - Completing assignments with an above adequate to adequate level of proficiency in the five areas of competency.

**B-**     **Satisfactory** - Completing assignments with a satisfactory level of proficiency in most areas of competency, and below adequate in some areas.

**C+**     **Unsatisfactory** - Improvement needed in the five areas of competency listed in the grading criteria.

**C**      **Below expectation** - Most likely caused by poor levels of execution, lack of participation incomplete work, and overall lack of performance/effort.

**C-**     **Well below expectation.**

**D**      **Significantly below expectation.**

| Assignments | Points | % of Grade |
|---|---|---|
| **Good Design / Bad Design** examples and concept revisions | 50 | 5% |
| **Opportunity Analysis:** User personas / insights, competitive analysis, blue ocean strategy, problem statement, design criteria, opportunity statement | 100 | 10% |
| **Rapid Visualization:** exercises in visualization/ideation techniques | 50 | 5% |
| **Initial Ideation:** brainstorming and initial concept sketches | 100 | 10% |

| | | |
|---|---|---|
| **User Feedback 1:** analysis of initial ideation and concept iteration based on user feedback | 50 | 5% |
| **Initial Prototypes:** Low fidelity prototypes Medium fidelity prototypes | 100 | 10% |
| **User Feedback 2:** analysis of low and medium fidelity prototypes and concept iteration based on user feedback | 50 | 5% |
| **3D Model:** 3D generated model | 150 | 15% |
| **Final Prototype:** 3D generated medium fidelity prototype | 200 | 20% |
| **Individual Process Deck** | 100 | 10% |
| **Participation** | 50 | 5% |
| **TOTAL** | 1000 | 100% |

## Grading Scale
Course final grades will be determined using the following scale

| Letter grade | Corresponding numerical point range |
|---|---|
| A | 100-94 |
| A- | 94-90 |
| B+ | 90-87 |
| B | 87-83 |
| B- | 83-80 |
| C+ | 80-77 |
| C | 77-73 |
| C- | 73-70 |
| D+ | 70-67 |
| D | 67-64 |
| F | 64 or below |

## Assignment Submission and Rubric Policy
Unless otherwise noted, all assignments must be submitted either on the Miro virtual whiteboard or as a PDF in the Google drive. For assignments delivered in class (such as presentations), the work must be completed before the commencement of the class session in which the assignment is due.

Absence is not an excuse for late work. Please be sure to communicate with the professors if you miss or are planning to miss a class to arrange for homework submission.

Assignments submitted late will be accepted but will incur the following grade penalties:
- 24 hours after deadline is a 10% deduction

- 24-48 hours after the deadline is a 20% deduction
- 48 hours to 3 days late is a 50% deduction
- Submissions more than 3 days late will receive NO CREDIT, unless approved in advance by the instructor.

Please note deliverable criteria as sighted on each assignment rubric (as shared in class and course materials), as deductions will be incurred by inaccurate submission processes.

## Grading Timeline
Grades and feedback for all assignments will be returned to students within three weeks of submission.

## Course Specific Policies
It is expected that students will conduct themselves in a professional manner. Use of connected devices such as cell phones, tablets, etc. during class critique is not allowed, and should only be used during class for the purpose of taking notes or researching information pertinent to the project at hand.

Although the focus of this class is to develop consumer products, it is also expected that much thought and care be put into every component of the project. This includes spelling, punctuation, and grammar, as well as attention to detail such as design layout, cleanliness and craftsmanship, and formatting of homework assignments. Not adhering to these professionalism standards will be reflected in the grade for participation or relevant assignments.

## Class Attendance Policy
It is expected that student attend every class. If a student is unable to attend a class, it is then expected that the student contacts the professor no less than 30 minutes prior to the start of class. If this is not possible due to circumstances outside the student's control, it is then expected that the student email the professor either during the class or shortly thereafter to inform the professor of the reasons for their absence. As there will be a considerable amount of groupwork done during class time, it is important students are present in order to contribute to their working groups. It is within the professor's discretion to negatively adjust a student's grade accordingly for unexcused absences (see below), so it is in the student's best interest to either be in class or stay in communication with the professor.

The Academy maintains rigorous academic standards for its students and on-time attendance at all class meetings is expected. Each unexcused absence will result in the lowering of the final grade by ⅓ of a grade (e.g., an A will be lowered to A-, and A- will be lowered to a B+, etc.). In addition, being tardy to class will count as one-third of an absence. Three tardies will equal a full course absence.

Students remain responsible for any missed work from all and any absences. Absence is not an excuse for late work. Please be sure to communicate with the professors if you miss or are planning to miss a class to arrange for homework submission. Extensions or other accommodations are at the discretion of the instructor.

In the case of prolonged illness, family emergencies, or other unforeseen serious issues, the student should contact the instructor to arrange for accommodation. Accommodation may also be made for essential professional or career-related events or opportunities.  Additionally, students who need accommodations for religious observations should provide advanced notice to instructors and student athletes should provide Travel Request Letters. All accommodations remain at the discretion of the instructor, and appropriate documentation may be required.

[Unless students provide an accommodation letter from USC's Office of Student Accessibility Services (OSAS)](#) or a letter from IYA Student Services detailing visa or travel restrictions, attendance and active participation

is expected in the classroom. Any student with such accommodations should submit their accommodation document to the instructor as soon as possible to discuss appropriate accommodations.

Students who are experiencing illness should not attend class in person. Please inform the instructor in advance of any class sessions that you can't attend for medical reasons, and accommodations will be arranged to view recorded lectures and submit alternatives to any missed class participation. Students will not be penalized for not attending class in person under these circumstances.

## Iovine and Young Hall Cleanout
The Academy is unable to store student projects and materials beyond the end of the semester. Students must remove all projects and personal materials from the Creators Studio, lockers/locker room, and other classrooms by the end of each semester. **All projects and materials left in Iovine and Young Hall will be discarded two days after final exams end. No exceptions.**

## Classroom norms
Active and respectful engagement and providing and receiving constructive criticism are expected in all class sessions.

## Academic Integrity
The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

## Policy for AI Generators:
Use of AI generators may be acceptable in some cases for this class. Should a student determine having AI generated material be beneficial to the outcome of the project, it is expected that the student seek approval from the professor ahead of time, and never pass the work off as being an original creation produced by the student.

## Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

## Course Evaluations

It is expected that every student participates in the end-of-semester course evaluations, as it is an important process to help determine student's experience of the class in order to continuously improve the course for future application.

**Course Schedule: A Weekly Breakdown**

|  | Topics/Daily Activities | Homework Assignments | Deliverable/Due Dates |
|---|---|---|---|
| Week 1a 8/27 | **Good Design / Bad Design** - Introductions - Lecture: The lessons I've learned/human centered design | - 3 examples of 'good' design products (1-2 products / slide) - 3 examples of 'bad design products (1-2 products / slide) | - 3 examples of good design - 3 examples of bad design - Product redesigns (3) – **Due Week 2** |

| | - Discussion: What makes a successful / unsuccessful product | - Pages should include photos/images of products, MSRP, and pros and cons (bullet points) of each product to support your opinion.<br>- Redesign three products to address opportunities for improvement<br>- Should be presented on three separate slides – each slide should show the original product along with a sketch or image of your proposed improved design. | |
|---|---|---|---|
| **Week 2**<br>9/3 | **Opportunity Analysis**<br>- Class presentations of good/bad examples and redesigns<br>- Project kickoff (framing and parameters)<br>- Team formation<br>- Discussion on competition and problem/opportunity analysis (Disney case study)<br>- Challenge exercise (time permitting) | - Determine a product category your team wishes to pursue based on the given project prompt<br>- Identify a target user profile<br>- Identify a minimum of 10 competitor products (include name of product, MSRP, Amazon star review, and list of pros and cons for each)<br>- Produce a list of design criteria in order of importance<br>- Create a positioning matrix to determine your product's blue ocean opportunity<br>- Develop a concise problem/opportunity statement | - Opportunity Analysis<br>**– Due Week 3** |
| **Week 3**<br>9/10 | **Initial Ideation**<br>- Team presentations of opportunity analysis<br>- Lecture on mind maps, problem framing and brainstorm techniques<br>(team break-out session) | - Create a mind-map showcasing different potential problems and touch points for your product category.<br>- Create minimum of 10 'How might we' framing questions | Initial Ideation:<br>- Mind-map<br>- 15-20 framing questions<br>**– Due Week 4** |
| **Week 4**<br>9/17 | **Rapid Visualization (pt1)**<br>- Lecture/demo:<br>Visualization Overview<br>Design Elements + Principles<br>- Lecture/demo:<br>Orthographic drawing<br>- In class work time | - Produce two pages (40 sketches) of lines/shapes<br>  - 10 parallel lines<br>  - 10 circles<br>  - 10 ellipses<br>  - 10 gradients<br>- Produce 10 sketches of orthographic drawings (front, left side, right side, and top for 5 different products) | - Shape sketches<br>- Ortho sketches<br>**– Due Week 5** |

| Week 5<br>9/24 | **Rapid Visualization (pt2)**<br>- Lecture/demo:<br>Perspective drawing and form sketching<br>- In class work time | - Produce 30 sketches of basic shapes in 2-point perspective (include shading)<br>  - 5 cubes from above<br>  - 5 cubes from below<br>  - 5 cylinders (standing and lying down)<br>  - 5 pyramids<br>  - 5 cones<br>  - 5 spheres | - Perspective sketches<br>**– Due Week 6** |
| Week 6<br>10/1 | **Rapid Visualization (pt3)**<br>- Lecture/demo:<br>Contour line sketching<br>- In class work time | - Produce 20 sketches<br>  - 10 random forms<br>  - 5 products with framing shapes surrounding them<br>  - 5 products with contour lines defining the form<br><br>Rapid Viz Deliverable:<br>  **- archive all rapid viz exercises into a single PDF doc and submit to Google drive** | - Contour line sketches<br>**– Due Week 7**<br><br>**Rapid Viz deliverable**<br>**– Due Week 7** |
| Week 7<br>10/8 | **Ideation Sketches**<br>- Lecture/demo:<br>Concept generation via 'What if' brainstorming exercises | - Produce a minimum of 15 sketches per team member of initial ideation concepts based on design criteria / 'what if' exercise | Initial Ideation Sketches:<br>**– Due Week 8** |
| Week 8<br>10/15 | **Initial Prototypes**<br>**-** Group presentations (initial concepts)<br><br>- Lecture/demo on producing low-fidelity prototypes for given product category | - Run initial concepts by target users to obtain feedback<br>- Produce a minimum of three revised sketches based on feedback, and one low-fidelity prototype per team member | Initial Prototypes:<br>- User feedback<br>- Revised concept sketches (3 per team member)<br>- Initial low-fidelity prototype (1 per team member)<br>**– Due Week 9** |
| Week 9<br>10/22 | **Revised Prototypes**<br>**-** Group presentations (initial prototypes)<br>- Demo on producing medium-fidelity prototypes | - Run initial prototypes by target users to obtain feedback<br>- Produce one medium-fidelity prototype per team member | Revised Prototypes:<br>- Medium-fidelity prototype (1 per team member)<br>**– Due Week 10** |
| Week 10<br>10/29 | **3D Modeling**<br>**-** Group presentations (revised prototypes)<br>- Lecture/demo:<br>Introduction to 3D modeling (Shapr3D) | - Run revised prototypes by target users to obtain feedback and produce a PDF document describing key takeaways<br><br>- 3D modeling exercises | User Feedback:<br>- Obtain user feedback on revised medium fidelity prototypes<br>**– Due Week 11**<br><br>3D modeling exercises:<br>**– Due Week 11** |
| Week 11<br>11/5 | - Lecture/demo:<br>Advanced 3D modeling (Shapr3D) | - Begin 3D modeling of final design | Final 3D model:<br>**– Due Week 13** |

| | | | |
|---|---|---|---|
| | - Individual feedback<br>- Work in class | | |
| Week 12<br>11/12 | - Lecture/demo:<br>3D printing/CNC/high fidelity model building techniques.<br>- Individual feedback<br>- Work in class | - Begin final prototype fabrication | Final prototype:<br>**– Due Week 16 (final)** |
| Week 13<br>11/19 | - Individual feedback<br>- Work in class | | |
| Week 14<br>11/26 | - Individual feedback<br>- Work in class | - Produce final deck (individual) synthesizing the work you have created from the semester. | - Individual synthesis deck (submit to Google drive)<br>**– Due Week 16 (Final)** |
| Week 15<br>12/3 | - Individual feedback<br>- Work in class | | |
| **Final Exam Week: 12/17, 4:30pm** | **Final Presentations**<br>Individual Process Deck Submission | | |

## Statement on University Academic and Support Systems

### Students and Disability Accommodations:
USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

### Student Financial Aid and Satisfactory Academic Progress:
To be eligible for certain kinds of financial aid, students are required to maintain Satisfactory Academic Progress (SAP) toward their degree objectives. Visit the Financial Aid Office webpage for undergraduate- and graduate-level SAP eligibility requirements and the appeals process.

### Support Systems:
*Counseling and Mental Health* - *(213) 740-9355 – 24/7 on call*
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*988 Suicide and Crisis Lifeline* - *988 for both calls and text messages – 24/7 on call*
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new,

shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

*Relationship and Sexual Violence Prevention Services (RSVP)* - *(213) 740-9355(WELL) – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

*Office for Equity, Equal Opportunity, and Title IX (EEO-TIX)* - *(213) 740-5086*
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

*Reporting Incidents of Bias or Harassment* - *(213) 740-5086 or (213) 821-8298*
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

*The Office of Student Accessibility Services (OSAS)* - *(213) 740-0776*
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

*USC Campus Support and Intervention* - *(213) 740-0411*
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

*Diversity, Equity and Inclusion* - *(213) 740-2101*
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency* - *UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

*USC Department of Public Safety* - *UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call*
Non-emergency assistance or information.

*Office of the Ombuds* - *(213) 821-9556 (UPC) / (323-442-0382 (HSC)*
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

*Occupational Therapy Faculty Practice* - *(323) 442-2850 or* otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.