San José State University
Department of Design / Industrial Design Program
DSID 143, Advanced Materials, Processes & Technology, Section 01, Fall 2016

Instructor: Ron Boeder

Office Location: Art 227

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Office Hours: TR 11:20 AM – 12:20 PM

Class Days/Time: TR 12:30 PM – 3:20 PM

Classroom: Clark 238

Prerequisites: Declared BSID Major, DSID 41, DSID 123A

Corerequisites: None

Course Fees: None

Canvas Course Management Website
Copies of the course materials such as the syllabus, assignment handouts, grading, etc. may be found on the DSID143 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 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.
Course Description

Advanced Materials, Processes and Technology will enhance themes covered in Materials and Processes I; that all design involves the ability to be creative and forward thinking while working with constraints and making compromises that are dictated by the ‘making’ processes and technologies that humans have developed over the millennia. While the previous course (DSID 41) focused on the most common materials and processes used in the design industry, this course will focus on the less common, more advanced and cutting edge materials and processes, and additionally will integrate discussions about technology and its role in the design process. It will also address the process of taking a design from initial concept through production specifications and manufacturing quotations. A product enclosure will be designed and documented for both low-volume, and high-volume manufacture.

Understanding the relevance of new technologies (the difference between reality and blue sky) and their implications in the objects and services we design is key to having a greater understanding of the role of design and its myriad applications. Students will be required to write three Technology Reports in this course, and one Material or Process Report. The reports will focus on the implications of the future direction of new materials, processes, and technological innovations. In addition to the written reports, students will present a multi-media presentations to the class for their selected Material or Process.

Course Goals and Student Learning Objectives

Upon successful completion of this course, students will be able to:

(LO1) Integrate materials and manufacturing processes into the design process.

(LO2) Identify, through research and sourcing of information, advanced materials and manufacturing processes.

(LO3) Select or recommend materials and manufacturing processes.

(LO4) Cite the rationale for selecting particular materials and manufacturing processes, in particular addressing the issue of low and high volume manufacturing and tooling amortization.

(LO5) Employ various research methods to source information; evaluate the application and timing of integrating new and emerging technologies in product designs.

(LO6) Identify and describe advanced manufacturing processes, including emerging materials and processes such as high tech ceramics, carbon fiber, smart fabrics, photovoltaic polymers, 3D printing techniques, robotics, mass customization, and more.

(LO7) Appropriately select and specify the details of manufacturing processes, such as graphics, finishing, joining, OEM components, etc.
(LO8) Generate the details required to document and specify a design for manufacture.

(LO9) Use and articulate additional considerations in the selection of production materials and processes, including: sustainability, durability testing, EMI/RFI, regulatory issues, assembly, and shipping/packaging.

Course Content Learning Outcomes

Weekly project assignments, and presentations taking a design from initial concept through industrial design control files ready for development of production documentation. (LO 1-9)

Final project depicting a product design with materials and processes as primary design criteria in both high-volume and low-volume. (LO1 and LO8)

Final digital presentation on a new or emerging technology applicable to industrial design. (LO5 and LO6)

Final digital presentation on a new, advanced, or exotic manufacturing process. (LO3, LO4, and LO7)

Research and development of a Materials and Processes Glossary of terms and acronyms. (LO2, LO6)

Create a materials and/or processes Sample Plaque. (LO2, LO6)

Required Texts/Readings

Textbook (Required by 2nd class meeting)


Other Recommended Readings


Industrial Design Techniques and Materials. Raymond Guidot (Editor), Jean-Baptiste Toulard (Contributor), Jean Grenier (Contributor), Jean-Jacques Salomon (Contributor). Publisher: Flammarion (September 5, 2006). ASIN: B005X4FBUW


Additional readings will be available on Canvas as needed throughout the semester.

**Required Materials List (required by 2nd class meeting)**

- Ream of 8.5 x 11 bond paper $10
- Ream of 11 x 17 bond paper $15
- 14 x 17 Marker Pad $25
- Printer ink $50
- Markers $100
- Pens, Pencils, Erasers, Drawing Tools $50
- Transportation Costs (fuel to field trips throughout the Bay Area) $100

**Recommended Materials List**

- Solidworks Software
- Keyshot Software

**Material requirements (required by first class meeting in October)**

- Microsoft Office Software (Student Edition) $50
- Adobe Design Suite Software (Student Edition) $200

**Material requirements (required by last class meeting in December)**

- Large format high-quality photo paper and ink $20
- Printing and Binding of 11 x 17 Process Book $100

**Shop Test**

The Department of Design requires that Industrial Design students attend and pass the shop safety orientation at least once each year. We will be showing the video in class and then you will have at least a week to review the video again on your own as it is posted.
online (http://www.sjsu.edu/atin/services/webcasting/events/shopysafety.html) now. The shop test date will be announced the first day of class. 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
Design Department Librarian
Teresa Slobuski
Teresa.Slobuski@sjsu.edu
phone: (408) 808-2318

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 necessary skill of drawing and sketching. Students are expected to be on time to class and when a class critique is planned, work is to be taped up to the walls by 10 minutes after the official start of the class period. Be ready to start the critique by 15 minutes after the class officially starts. 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. 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 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, organizers, and laptops are also disruptive and inconsiderate to your classmates and instructors. Phones are NOT permitted in this class and you will be asked to turn off and surrender your phone at the start of each class. If you disrupt or withdraw from class activities due to your inability to silence your devices it will count against the participation portion of your final grade. If personal issues (family, medical, etc) require you to leave your phone on, you may do so by making arrangements with the instructor in advance.

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 section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic calendar web page located at http://www.sjsu.edu/academic_programs/calendars/academic_calendar/. The Late Drop
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 at http://www.sjsu.edu/advising/

Assignments and Grading Policy

Students will be required to:

1) Develop three research reports: Technology, Material, and Manufacturing Process.

2) Develop a Material and/or Process Plaque.

3) Complete weekly homework assignments related to final project.

4) Complete a Final Project – Design, Specification, ID Control Documentation including design specifications and CMF, and Manufacturing/Technology Research, for a 3D Printer. Two versions will be designed: 1) high-volume, and 2) low-volume. Digital and Hard-copy Presentations will be the final deliverables.

5) Students will be engaged in lectures, project and report presentations during class meeting times and they will be assessed on engagement in those activities in their Participation grade (LO 1-9). Students will have homework assignments to do outside of class (up to 12 hours per week) that include reading, research, sketching, analysis/reports, 2D and 3D CAD. (LO 1-9). Students will be required to turn in all Research Reports at the mid-term date and present between that date and the end of the semester (LO 1-9). Students will be required to turn in and present their final project (3D Printer) by the second to last day of class (LO 1-9). Grading will follow the standard SJSU A-F system.

The structure of each week will typically be as follows:
Day 1: Presentation and Critique of previous week’s assignment (also Research Report presentations in second half of semester.)
Day 2: Lecture/Demo, Assignment, Work in class, activity and/or field trip (also Research Report presentations in second half of semester).

Grading is weighted as follows:
Class Participation (LO 1-9): 10%
Weekly Homework Assignments, Reports, and Sample Plaque (LO 1-9): 70%
Final Project / Presentation (LO 1-9): 20%

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
Grades for assignments will be divided evenly throughout the semester and receive equal credit. All assignments are due on time. **No late work is accepted.** No assignments will be accepted via email or Canvas. However, your final presentation will be reviewed at the end of the semester, and will be graded on completeness (so you should include all assignments, even those not previously turned in) and presentation quality. Therefore, all projects should be included in this presentation and reworked if substandard. Extra credit is not possible in this course as the workload is significant enough. A passing grade for this course is a C. The Participation grade in this course will be assessed through your engagement in presentations, critiques, videos, and field trips. Actively engaging and exhibiting life-long learning skills during class are the mode by which participation is assessed.

**University Policies**

**Academic integrity**

Your own commitment to learning, as evidenced by your enrollment at San José State University and the University’s Academic Integrity Policy (**Academic Senate Policy S07-2**), require you to be honest in all your academic course work. Faculty members are required to report all alleged violations of the Academic Integrity Policy to **Student Conduct and Ethical Development**. Instances of academic dishonesty will not be tolerated. Cheating or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failure in the course and administrative sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that San José State's Academic Integrity Policy requires approval of instructors.

**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 requires that students with disabilities requesting accommodations must register with the **Disability Resource Center** (DRC) at http://www.drc.sjsu.edu/ to establish a record of their disability.

**Student Technology Resources**

Though it is not anticipated that you will need any of this for this class, computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and on the 2nd floor of the Student Union. Computers are also available in the Martin
Luther King Library. 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.

Learning Assistance Resource Center

The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic potential and to inspire them to become independent learners. The Center's tutors are trained and nationally certified by the College Reading and Learning Association (CRLA). They provide content-based tutoring in many lower division courses (some upper division) as well as writing and study skills assistance. Small group, individual, and drop-in tutoring are available. Please visit the LARC website for more information at http://www.sjsu.edu/larc/.

Peer Mentor Center

The Peer Mentor Center is located on the 1st floor of Clark Hall in the Academic Success Center. The Peer Mentor Center is staffed with Peer Mentors who excel in helping students manage university life, tackling problems that range from academic challenges to interpersonal struggles. On the road to graduation, Peer Mentors are navigators, offering “roadside assistance” to peers who feel a bit lost or simply need help mapping out the locations of campus resources. Peer Mentor services are free and available on a drop–in basis, no reservation required. The Peer Mentor Center website is located at http://www.sjsu.edu/muse/peermentor/
DSID 143 / Advanced Materials, Processes & Technology, Spring 2016, Course Schedule

Schedule is subject to change with fair notice (one week) in class or via notice on CANVAS.

Table 1 Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics, Readings, Demos, Assignments, Deadlines</th>
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<tbody>
<tr>
<td>1</td>
<td>R 1/28</td>
<td>Lecture: Course Introduction</td>
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<td>Homework Assigned: All Research Report Topics (LO 1-9)</td>
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<td>3D Printer - Research, Target Market Persona Selection/Definition</td>
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<td>Homework Due: None</td>
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<td>Activity: 3D printer - Research, Target Market Persona Selection/Definition</td>
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<td>(LO 1-9)</td>
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<td>2</td>
<td>T2/2 R2/4</td>
<td>Lecture: Technology Research</td>
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<td>Homework Assigned: All Research Reports (LO 1-9)</td>
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<td>3D Printer Concept Sketches (12) (LO 1-9)</td>
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<td>Homework Due: Report Topics</td>
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<td></td>
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<td>Activity: Research Report Development (LO 1-9)</td>
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<td>3</td>
<td>T2/9 R2/11</td>
<td>Lecture: Trends in Materials, Processes, and Technology</td>
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<td>Homework Assigned: 3D Printer – Refined Concepts (3) (LO 1-9)</td>
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<td>Homework Due: 3D printer - Concept Sketches (12)</td>
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<td>Activity: Research Report Development (LO 1-9)</td>
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<td>4</td>
<td>T2/16 R2/18</td>
<td>Lecture: Low-Volume vs. High-Volume Manufacture</td>
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<td>Homework Assigned: 3D Printer – “Final” Design orthographic views and perspective sketches (LO 1-9)</td>
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<td>Homework Due: 3D Printer – Refined Concepts (3)</td>
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<td>Activity: Research Report Preliminary Presentations (LO 1-9)</td>
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<td>Week</td>
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<td>5</td>
<td>T 2/23 R 2/25</td>
<td><strong>Low-Volume Manufacturing Processes</strong></td>
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<td>6</td>
<td>T 3/1 R 3/3</td>
<td><strong>High-Volume Manufacturing Processes</strong></td>
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<td>7</td>
<td>T 3/8 R 3/10</td>
<td><strong>OEM Components</strong></td>
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<td>8</td>
<td>T 3/15 R 3/17</td>
<td><strong>Fastening and Assembly</strong></td>
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<td>9</td>
<td>T 3/22 R 3/24</td>
<td><strong>Vendor Research</strong></td>
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<td>Date</td>
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<td>10 T 3/29 R 3/31</td>
<td>Holiday No Class</td>
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<td>Research Report Final Presentations (LO 1-9)</td>
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<tr>
<td>11 T 4/5 R 4/7</td>
<td>Lecture: Mechanical Drawings</td>
<td>3D Printer - 2D Mechanical Drawings and Final BOMs (LO 1-9)</td>
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<td>Homework Due</td>
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<td>Activity</td>
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<tr>
<td>12 T 4/12 R 4/14</td>
<td>Lecture: Finishes, Color, Material Specifications</td>
<td>3D Printer - Finishes (3 rendering variations) (LO 1-9)</td>
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<td>Homework Assigned</td>
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<td>Homework Due</td>
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<td>Activity</td>
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<tr>
<td>13 T 4/19 R 4/21</td>
<td>Lecture: None</td>
<td>3D Printer - Final Renderings (LO 1-9)</td>
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<td>Activity</td>
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<tr>
<td>14 T 4/26 R 4/28</td>
<td>Lecture: Presentation Techniques</td>
<td>3D Printer - Digital Renderings PDF Files (LO 1-9)</td>
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<tr>
<td>15</td>
<td>Research Report Final Presentations (LO 1-9)</td>
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<td>T 5/3 R 5/5</td>
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<tr>
<td>16</td>
<td>Research Report Final Presentations (LO 1-9)</td>
<td>None</td>
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<td>T 5/10 R 5/12</td>
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<tr>
<td>Final Exam</td>
<td>Final Exam from 12:15 PM – 2:30 PM</td>
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