San José State University
Department of Design / Industrial Design Program
DSID 126/226 Ergonomics for Design,
Section 01, Spring 2016

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<tr>
<th>Instructor:</th>
<th>Prof. Gerald Skulley</th>
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<tr>
<td>Office Location:</td>
<td>Art # 113</td>
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<tr>
<td>Telephone:</td>
<td>(408) 924-XXXX</td>
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<tr>
<td>Email:</td>
<td><a href="mailto:gerald.skulley@sjsu.edu">gerald.skulley@sjsu.edu</a></td>
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<tr>
<td>Office Hours:</td>
<td>Tues/Thurs 6:30-7:30 By appointment with 24 hour notice</td>
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<tr>
<td>Class Days/Time:</td>
<td>Tues/Thurs 3:30PM-4:20PM</td>
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<td>Classroom:</td>
<td>Industrial Studies 118</td>
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<td>Prerequisites:</td>
<td>DSID 22; DSID 32; DSID 32A; Declared BSID Major</td>
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<td>Course Fees:</td>
<td>$45</td>
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Canvas Course Management Website

Copies of the course materials such as the syllabus, assignment handouts, grading, etc. may be found on the DSID 126 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 D2L for course updates, assignments, etc. All class correspondence will also be managed through the class CANVAS site. To set email forwarding, go to “Preferences” and click the “Email” tab to manage your options. Under “Forwarding Options”, check the box “Forward incoming messages to an alternate email account.” Type your alternate Email Address in the box and save your preferences at the bottom. This should forward all class correspondence to your preferred email address.
Introduction

“We bear in mind that the object being worked on is going to be ridden in, sat upon, looked at, talked into, activated, operated, or in some way used by people individually or in mass.

When the point of contact between the product and the people become a point of friction, then the industrial designer has failed.

On the other hand if people are made safer, more comfortable, more eager to purchase, more efficient—-or just plain happier---by contact with the product, then the designer has succeeded.”

– Henry Dreyfuss

Big Idea: There are key ergonomic issues that must be addressed by designers to ensure the most acceptable levels of safety, comfort and ease of use for all products.

Course Description

Ergonomics in Design is an introductory course that introduces students to a key principle of design – “human factors” – that impact product design and use. This course covers ergonomic issues as they pertain to product design and development. We will cover these issues through a combination of lectures, classroom discussions, and individual and team projects. The concepts and information for the course will be obtained in assigned readings, lectures, design assignments, hand-outs and classroom discussions. Your knowledge of the concepts and information covered will be evaluated according to how successfully you can discuss the topics in class and apply the materials on projects assignments.

The course aims to equip students to investigate human-use implications of their design activities with regard to issues such as usability, comfort, efficiency and safety. Project work and workshops will focus on human factors/ergonomics principles and research methods and their application in Industrial Design and product development.

Learning activities build up on work carried out in previous Industrial Design courses, and are intended to increase students understanding of the complexities of design practice. Projects allow students to gain further experience in applying research and design methodologies to solve problems of moderate complexity. Each assignment has a strong emphasis on innovation, technical resolution and documentation to a professional standard. A rigorous and responsible approach to product design is fostered through working on projects with "real-world”, commercial, environmental, technological or industrial constraints. Working on teams will simulate the multi-discipline approach most often encountered in a typical
product development process.

There will be one primary project and two smaller projects assigned throughout the course to provide you with the opportunity to apply the concepts discussed in class. We will begin with a functional analysis of an existing product. This will be followed by the design of a simple hand tool or hand held product. The course will culminate with the primary project that you will work on in teams.

Course Goals and Student Learning Objectives:

- Demonstrate the relevance & importance of ergonomics in society and industry.
- Highlight how to recognize and identify human factors problem.
- Use foundational research methodologies such as 1x1 interviews, ethnography etc.
- Consider and integrate ergonomic and anthropometric information into design concepts.
- Increase student interest and awareness of the importance of ergonomic issues in everyday things and actions in physical and mental work.
- Use drawing and rendering to effectively communicate and explore design intent.
- Communicate a written design proposal in a succinct manner using hand sketches, 3D form studies, including supporting data and graphs as required.
- Apply and articulate a practical design methodology and process to design projects.
- Generate physical artifacts to demonstrate and evaluate design solutions.
- Apply knowledge of science, technology and industrial design principles.
- Be able to critically identify and analyze design problems from user and consumer perspective.
- Apply creativity and technical aspects in product design.
- Adapt to a changing design situation, taking into consideration the cultural, political and environmental aspects of a project.
- Be able to carry out a duty with sensitivity and awareness of user safety, environment and special needs people.
- Students should be able to use software applications (e.g., MS Office Suite and Adobe Creative Suite) to prepare documents and data as well as make highly informative, multimedia presentations.
- Students should also be able to use basic measurement tools and fabrication equipment.

Course Content Learning Outcomes

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

(LO1) Demonstrate an ability to design and analyze consumer products, user interactions and environments.
(LO2) Develop, execute, and document quantitative test procedures for design evaluations and recommendations.
(LO3) Identify and analyze problems from a consumer perspective in order to satisfy the needs of the customer.
(LO4) Apply creativity and technical ability in product design.
(LO5) Organize and manage product design projects individually and collaboratively in teams. (LO6) Produce visual presentation materials and present technical report.
(LO7) Communicate effectively with co-workers as a team member, user, and customer.
(LO8) Demonstrate professional ethics and moral responsibility in design practice.
(LO9) Adapt to changing design situation taking into consideration the cultural, political, and environmental aspects of a design project.
(LO10) Evaluate and use new technology.
(LO11) Design with sensitivity and awareness towards safety, the environment, and consideration of people with special needs.
(LO12) Discuss, critique, and engage in professional review of theirs and their peers work. (LO13) Use anthropometric data in design solutions.
(LO14) Identify human factors problems.
(LO15) Use check-lists and descriptor lists as basis of research & survey techniques. (LO16) Prepare ergonomics analysis reports.

**Required Texts/Readings**

There are two textbooks & a ‘Reader” required for this course, they are available at the SJSU bookstore or [www.amazon.com](http://www.amazon.com).

The Reader Titled “Ergonomics for Design” is available from Academic Pub, It is available in printed form or as an eReader. Link attached below.


Additional readings may be required and will be assigned throughout the semester. The textbooks are:

**Ergonomics: Foundational Principles, Applications, and Technologies**

*(Ergonomics Design and Management : Theory and Applications)* by Pamela McCauley-Bush (Hardcover - December 13, 2011)


**Other Recommended Readings include:**


**Required Materials List**

**Team Projects:**
Material requirements are unique to each design team and dependent on assignment chosen. Students can expect to spend between $150-350 on their project, depending upon the nature of their solution. Team project expenses should be shared equally amongst the teams.

During the course of the class 2-3 individual projects will be assigned requiring various prototype/model making supplies. Estimated to be appox $100-$150 per assignment.

**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/atn/services/webcasting/events/shopysafety.html](http://www.sjsu.edu/atn/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**

Rebecca Feind, Associate Librarian for Design Department
Email: Rebecca.Feind@sjsu.edu
Phone: 408.808-2007
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 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, 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 activity and are unable to silence your devices, it will count against the participation portion of your final grade (LO 12). 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

Grading will follow the standard SJSU A-F system.

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 as follows:

Assignments  25%
Participation in class exercises and activities  15%
Mid-term Project and Design Notebook  20%
Final Project Review and Team Assessment  20%
Final Project Process Book  20%

All assignments are due on time. No late work is accepted. A passing grade for this course is a D- though the Industrial Design program requires a 3.0 to graduate in the major. The Participation grade in this course will be assessed through your engagement in Work/Practice sessions, assignment pin-ups, class discussions and critiques. Actively engaging and exhibiting life-long learning skills during class are the mode by which participation is assessed.

University Policies

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University’s Academic Integrity policy, located at http://www.sjsu.edu/senate/S07-2.htm, 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 is available at http://www.sa.sjsu.edu/judicial_affairs/index.html.

Instances of academic dishonesty will not be tolerated. Cheating on exams 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 failing grade and 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 your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Policy S07-2 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 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/.

SJSU Writing Center

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. The Writing Center website is located at http://www.sjsu.edu/writingcenter/about/staff/.

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 126 /226 Ergonomics in Design, 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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| 1    | Th 1/28  | - Review of syllabus, course content, assignment structure, course expectations, present project objectives and opportunities, materials requirements.  
        - Assign First Project & first readings - Design assessment.  
        - Schedule Shop Test if required. |
| 2    | Tu 2/2   | - General HF / Ergo Lecture; The Designers role  
        - Individual product selected & approval for analysis assignment. |
|      | Th 2/4   | - Final Product Formal Analysis Presentations & Reports due.  
        - Project One Individual Presentations ½ class chosen at random. |
| 3    | Tu 2/9   | - Final Product Formal Analysis Presentations & Reports due.  
        - Project One Individual Presentations reminder of class chosen at random.  
        - Reading Introduction Chapter 1&2 McCauley. |
        - Discussion Topic Reader #1 Tech to Translate Research to Products. |
| 4    | Tu 2/16  | - Lecture: Human Factors and Aesthetics  
        - Graphic Symbol exercise; In-Class Graphical Icon Evaluation. |
        - McCauley Chapter 3  
        - Graphical Gauge/Meter in class exercise. |
| 5    | Tu 2/23  | - Lecture: Human error vs. Design error / Bad Design  
        - Reading Assignment; Reader #6 Assembly Complexity Self Assembly Products. |
|      | Th 2/25  | - Review instructional exercise assignment  
        - Reading assignments:  
        - Topic Reader # 11-Building Empathy with the User  
        - Topic Reader # 14-Cutural Ergo Issues in Product Design. |
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| 6 | Tu 3/1 | • Human Factors Hand Anatomy and Handle Design Presentation  
• Lecture: Design of Workplaces & Hand tools. McCauley Chapter 6 – Design of Workplaces & Hand Tools  
• Assignment 2 Introduced & Reviewed  
• Reading assignment (Class handout) Chapter 12 Hand Tools and Devices “Human Factors in Engineering & Design” Sanders & McCormick |
|   | Th 3/2 | • Lecture: Work related Musculoskeletal Disorders. McCauley Chapter 7  
• Assignment 2 Due: Hand Tool Design Exercise, “Sanders & McCormick” |
| 7 | Tu 3/8 | Work in Class – Follow up Assignment No 2. Develop individual design assignment criteria and scenario.  
• Research Product criteria & usage, current market landscape, analyze competitive & similar product categories & system, develop user persona. |
|   | Th 3/10 | Be prepared to discuss findings & proposed product direction to date.  
Type of work tasks, user persona, workflow, etc  
Commence concept exploration & idea development.  
Concepts exploration. 25 Concept Sketches for review next class |
| 8 | Tu 3/15 | • Concept Sketches presented  
• Develop Hand Tool Project criteria & Ergonomic requirements  
• Explore Workflow  
• Propose Test Validation & Evaluation Protocol. |
|   | Th 3/17 | • Project Progress review-Presentation Materials-Check list  
• Work in Class/Model Shop- Develop design for model fabrication Deliverables to include: concept sketches, concept refinements, design development, scaled orthos (exterior & components layout) anthropometric dimensioning, materials & color rational etc. |
| 9 | Tu 3/22 | **Hand Tool Project Presentation:**  
Students chosen at random ½ class per session |
|   | Th 3/24 | **Hand Tool Project Presentation:**  
Students chosen at random ½ class per session |
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<th>Tu 3/29</th>
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<th>Tu 4/5</th>
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<th>Tu 4/12</th>
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<th>Tu 4/19</th>
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<th>Tu 4/26</th>
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<th>Tu 4/28</th>
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<td>Spring Break - Campus Closed</td>
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<td>11</td>
<td>Tu 4/5</td>
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<td>Lecture: Persona - Methods to Produce Focused Consumer needs</td>
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<td>Reading assignment-Reader #11- Empathy Meets Engineering</td>
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<td>Reading assignment Chapter 8 Ziesel – Traces Lecture:</td>
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<td>Assignment 3 (Team Assignment) introduced and discussed</td>
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<td>Th 4/7</td>
<td></td>
<td>In class discussion of individual findings &amp; experiences</td>
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<td>Reading assignment-Reader #11- Empathy Meets Engineering</td>
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<td>Anthropometric data-hand out</td>
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<td>Teams assembled (at random) Phase 1 of assignment 3</td>
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<td>12</td>
<td>Tu 4/12</td>
<td></td>
<td>Open Class Discussion</td>
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<td>Work in Class ;1x1s with teams &amp; instructor</td>
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<td>Th 4/14</td>
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<td>Lecture Topic TBD (Reader #26 Needs Analysis &amp; validation)</td>
<td></td>
<td>Teams to select area of design and outline overall project procedure &amp; deliverables</td>
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<td>Team Progress reviewed 1x1 with instructor</td>
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<td>Work on project in class</td>
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<td>13</td>
<td>Tu 4/19</td>
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<td>Assignment 3-Team Assignment. Teams to structure findings into clear presentable design objectives.</td>
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<td>Review project plan, research, user-interviews, scripts, validation Individual student team consultations</td>
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<td>Th 4/21</td>
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<td>Assignment 3Team progress report</td>
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<td>Work in class &amp; Shop-prototype build- physical or virtual.</td>
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<td>Tu 4/26</td>
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<td>Assignment 3Team progress report</td>
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<td>Work in class &amp; Shop-prototype build- physical or viral.</td>
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<td>1x1 with Instructor</td>
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<td>Individual student consultations. Review Material for Content</td>
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<td>Th 4/28</td>
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<td>Assignment 3 progress report</td>
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<td>Work in class &amp; Shop-prototype build- physical or virtual.</td>
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<td>15</td>
<td>Tu 5/3</td>
<td>Individual student consultations - work in progress to be reviewed</td>
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<td>Th 5/5</td>
<td>Review Material for content &amp; Length of Presentation Work on project in class</td>
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<td>16</td>
<td>Tu 5/10</td>
<td>Team in class Presentations - ½ class selected at random. Class Participation critique &amp; Discussion.</td>
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<td>Th 5/12</td>
<td>Team Presentations - ½ class selected at random. Class Participation critique &amp; Discussion.</td>
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<td>17</td>
<td>TBA</td>
<td>Submit Final Team presentation Material(s) Detailed Submission Instructions to be provided</td>
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