# San José State University
## Aviation and Technology Department
### Tech 190B: Senior Project II, Section 1, Spring 2018

**Course and Contact Information**

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|---|---|
| **Instructor:** | Charles Foster |
| **Office:** | Engr 397 |
| **Email:** | Charles.foster@sjsu.edu |
| **Office Hours:** | TH: 9:00 AM - 12:00 PM; |
| | FRI: 9:00 AM – 12:00 PM (and by appointment) |
| **Class Days & Time:** | Wednesday: 1:30 – 4:15 PM |
| **Class Room:** | **E490** (IS 119, IS 122, E103) |
| **Prerequisites:** | Tech 190A, E100W and Senior Standing |

**Course Materials**
Course Text: Design Thinking. Other course materials provided on Canvas

**Catalog Description**
Second half of a one-year team project carried out under faculty supervision construction, testing, and evaluation of the design from Tech 190A culminating in demonstrations and written and oral presentations to faculty and peers. Lecture/Seminar 1 hour, Laboratory 6 hours, 3 units.

**Prerequisite:** Tech 190A (with a grade of C or better)

## Course Overview and Purpose

Tech 190B and its complementary course Tech 190A are designed to prepare seniors for careers after graduation as well as to show that they can work together with other students to bring what they have learned in their programs into a successful team project that reflects all the knowledge and skills of the team members. These Senior Project courses are also designed to offer students an interdisciplinary experience involving both manufacturing systems and computer, electronics, and network technology as they work to complete their projects. Tech 190A and Tech 190B must be taken in sequence, starting with 190A in the fall semester of their final full academic year at SJSU. This means that students who wish to take this course must have applied for graduation before the start of the fall semester, and must normally be graduating in either the following May or in December of the next year.

Tech 190B is the second class in the sequence and will focus strongly on production of product design and proposal developed in Tech 190A.  Therefore, the bulk of the work in Tech 190B is the planning and fabrication of a prototype for the actual product idea. While most of the activities will be undertaken in the labs, there will be in-class planning activities, homework, activities outside class, and oral/written reports. Students must have access to high speed internet, a computer, access to Canvas, the SJSU learning management software, and access to CAD, Multisim, and basic word processing and spreadsheet software (Word and Excel or equivalent).

**Course Learning Outcomes**
Upon successful completion of this course, students will be able:

1. To work effectively on a team of students to complete a project.

2. To define the societal needs, carrying out market study/economic and budget analyses.

3. To develop a complete set of functional specifications for the project.

4. To develop design models and/or drawings for prototype and final design.

5. To develop a schedule, and meet schedule and budget constraints.

6. To procure, fabricate, and assemble prototype and final design hardware.

7. To evaluate, test, and analyze prototype and final design.

8. To describe the global, social or cultural influences of the project.

9. To describe the effects of their project on society locally and/or globally.

10. To evaluate and describe in detail the environmental and economic impact of the project.

11. To evaluate and describe the health and safety of the project and its effect on quality of life.

12. To write reports and make presentations effectively.

**Required Textbook and Other Materials**
1. Michael G. Luchs, Scott Swan, Abbie Griffinv (2015). Design Thinking: New Product Development Essentials from the PDMA 1st Edition. Wiley-Blackwell. (eCopy is available at King Library located at: http://ebookcentral.proquest.com.libaccess.sjlibrary.org/lib/sjsu/detail.action?docID=4041673). (**Required for course**):
2. Multisim or other appropriate electronic design software. (**Required for course**):
3. Student Edition of 2016-2017 SolidWorks CAD software, available at any of the following sites (**Required for course**):
    a) Available on all 30 workstations in the class and some selected college labs.
    b) http://www.novedge.com/products/2928
    c) Spartan Bookstore's website: http://www.creationengine.com/html/ss_spartan.html
4. Other readings and handouts as assigned.
5. A minimum of 16g flash drive

6. Laptop/notebook computer with ample memory and speed
7. Scientific hand calculator with trig and square root functions
8. Safety goggles
9. All needed materials as specified on first project proposal's bill of materials
10. All needed machines, hand/power tools and cutting tools as specified in the first project proposal
11. Appropriate test and measurement instruments:
    a) For lengths – rulers, tape measure, digital calipers etc.
    b) For electronics: digital test instruments – multimeters, voltmeters etc.

# Course Requirements

1. In order to receive a passing grade, a student must:
   a. Demonstrate attention to punctuality and sensitivity to time requirements.
   b. Complete all project tasks and meet all of the milestones.
   **c.** Attend weekly meetings with team members and project advisor. **While attendance is not mandatory, students should note the importance of their presence to plan and complete the project as proposed, and must therefore notify the instructor and their group members with prior written notices if they will not be in class for a day's activities. However, too many absences suggest a student's lack of readiness for the project and may lead to a student's dismissal from the project. Instructors will use their judgement in knowing when too many absences are involved.**
   d. Complete all deliverables by the due dates specified by the instructor.
   e. Participate in the final project presentation.
   f. Complete and submit all take-home assignments as scheduled.
   g. Take exit exam on time when applicable.

2. At the end of the semester, each student (or team) is required to:
   a. Submit a final project report.
   b. Demonstrate prototypes and other artifacts during the final presentation.

## Senior Project (80%)
The main thrust of Tech 190B is to produce a well-planned senior product. Therefore, the goal of senior project is to produce the original product developed in Tech 190A. This new product design was undertaken in Tech 190A, resulting in a technical report which included detailed work on the product's feasibility studies, specifications, analysis, evaluation and full documentation. The senior project also provides a capstone experience in design to meet an identified need or problem, from concept to fabrication and validation of the final product. In accomplishing this, students will familiarize with general industry practices as well as develop creative abilities in solving design problems. Teamwork skills in the design of products and understanding of professional practices, engineering ethics, as well as global and societal issues are developed.

The bulk of the points in Tech 190B is dedicated to the activities surrounding the project. The senior project has five main gradable areas, including: **Project Schedule Plan Execution and Deliverables, Project Presentation, Finished Product and**

**Quality, Group Report, and technical report Content Organization and Submission.** Each of these areas has subdivisions which are graded and add up to their predetermined points. The details of the five areas of the senior project will be discussed in a separate handout during the project's introduction.

## Class Assignments (20%)

There will be five (5) class assignments designed to help students understand the various aspects of Tech 190B. Two of these assignments will be on the various manufacturing processes undertaken in the production of the senior project, while the other three will come from selected chapters of the required text. These assignments will be issued in class at various times in the semester during and after class discussions. Each of the assignments is worth 4% of the course grade and is due in class as scheduled by the instructor.

| Grading | | Points | % |
|---|---|---|---|
| **1. Senior Project:** | | **200** | **80%** |
| a. Project Schedule Plan Execution/Deliverables: | | 90 | |
| i. Engineering Changes Documentation | | (10) | |
| ii. Comprehensive Schedule | | (10) | |
| iii. Compliance to Schedule | | (15) | |
| iv. Status Reports (incl. meeting minutes, avail.) | | (55) | |
| b. Final Project Written Report | | 25 | |
| c. Report Content Organization and Submission | | 10 | |
| d. Project presentation | | 25 | |
| e. Finished prototype and quality | | 50 | |
| **2. Class Assignments (10 X 5)** | | **50** | **20%** |
| **Total** | | **250  =** | **100%** |

| | | |
|---|---|---|
| A+ : > 97 | A  : 93 - 96 | A- : 90 – 92 |
| B+ : 87 – 89 | B  : 83 - 86 | B- : 80 – 82 |
| C+ : 77 - 79 | C  : 73 - 76 | C- : 70 – 72 |
| D+ : 67 – 69 | D  : 63 - 66 | D- : 60 – 62 |
| F   : < 60 | (0.5 - 0.9) = 1 | (0.1 - 0.4) = 0 |

**Policy on Exams, Assignments and Reports:** There are no makeup assignments, reports, in-class tests or exams. Assignments missed are excused only with **written** documentation of unanticipated personal emergencies or by prior **written** permission of the instructor.

**Report Due Dates:** Late reports are not accepted.  The grade of any late reports will be assigned a "zero" mark.  Late reports may or may not be graded.  As with exams and tests, late reports are excused only with **written** documentation of unanticipated personal emergencies or by prior **written** permission of the instructor.

**Classroom and lab Protocol**

    **A. Class and Lab Times and Usage**

While the bulk of Tech 190B is on lab activities, the class will normally begin in the assigned classroom where important announcements, lectures (when applicable), group meetings, and other important discussions will be held. From there, student teams can proceed to their needed lab areas for production of their products. Instructor may also call all teams to meet in the classroom if there is need for any discussions that may involve the entire class.

    **B. Laboratory Access**

Projects are expected to involve activities and lab work related to both CENT and MFGS knowledge and skills; thus, key labs will be available to this class. You are expected to use the labs as needed during the class hours to conduct work for your projects. You may use the labs at any time they are available, following correct lab safety guidelines at all times. You will need permission to use the labs when other instructors are using them. In addition, E390 is a college lab with many workstations and software available to all college of engineering students. It is open M-F 7:00 AM - 11:00 PM.

- PLEASE NOTE that some CENT students who have not taken Tech/ME 20 may be at a disadvantage in CAD systems, but can easily catch up with practice if necessary. However, CENT students are expected to use Multisim.

    **C. Project Materials**

Since each project will be unique and cannot be anticipated, materials and parts required for group projects must be obtained independently by each group. Students are encouraged to design projects which are inexpensive, and/or to find industry sponsors for project components and materials.

    **D. Participation, Leadership and Initiative**

Note: The senior project courses Tech 190A & 190B are largely student-driven. Your leadership and initiative make up a significant portion of your course grade. While senior project work is done in teams, you must also be a self-starter to carry your share of project workload, to work effectively in your groups, and to seek help when it is needed. Your ability to do this will strongly affect your grade.

**University Policies**

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo) at [http://www.sjsu.edu/gup/syllabusinfo/](http://www.sjsu.edu/gup/syllabusinfo/)"

**Senior Project II Course ~ Semester Schedule – Spring 2018**
**Silicon Valley Leadership Symposia, Thursdays from noon to 1 pm in Engr 189**
**https://engineering.sjsu.edu/our-college/events/silicon-valley-leaders-symposium**
*This course schedule is subject to change with due notice*

| Wk | Week of: | Topic (lecture content) | Recommended Readings and (Assignment Due Dates) |
|---|---|---|---|
| | *Class meets _____* | *When there is no lecture specified, you are expected to be working on your design projects and/or assignments.* | *All assignments due as scheduled unless stated otherwise.* |
| 1 | Jan. 24 (Wednesday) | • Orientation to the class.<br>• Review of Greensheet/Requirements<br>• Engineering, Membership, or Process Changes Begin<br>• Group meeting and planning | All Readings are from the Required Text (Design Thinking), Handouts and Outside Materials Provided in Class or Web Site. |
| 2 | Jan. 31 | • Introduction to Senior Project<br>• Manufacturing Process Definitions<br>• Group Meeting and Planning | • Assignment 1: Review Processing Terminologies Found At: https://www.jobshop.com/CategoryList.aspx?Category=All (Due 2/7) |
| 3 | Feb. 7 | • Lab Exercise<br>• Group Meeting and Planning | • 1st Status Report Due |
| 4 | Feb. 14 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 2nd Status Report Due<br>• Assignment 2: Chapter 23: Face and Interface Product Experiences Through Integrated User Interface and Industrial Design. (Due 2/21) |
| 5 | Feb. 21 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 3rd Status Report Due |
| 6 | Feb. 28 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 4th Status Report Due<br>• Assignment 3: Manufacturing for Quality (Due 3/7) |
| 7 | Mar. 7 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 5th Status Report Due |
| 8 | Mar. 14 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 6th Status Report Due |

| | | | • Assignment 4: Chapter 24: Intellectual Property Protection for Designs (Due 3/21) |
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| 9 | Mar. 21 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 7$^{th}$ Status Report Due |
| **10** | **Mar. 26-30** | • **SPRING BREAK (NO CLASSES)** | • **SPRING BREAK** |
| 11 | Apr. 4 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • Assignment 5: Chapter 25: Design Thinking for Sustainability (Due 4/11) |
| 12 | Apr. 11 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 8$^{th}$ Status Report Due |
| 13 | Apr. 18 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 9$^{th}$ Status Report Due |
| 14 | Apr. 25 | • Lab Exercise<br>• Group Meeting and Planning<br>• Meet with Project Advisor | • 10$^{th}$ Status Report Due |
| 15 | May. 2 | • Report Final Preparation and Writing<br>• Lab Exercise (Last Minute Preparations)<br>• Group Meeting and Planning | • Turn-in final project report<br>• Cleanup Designated Labs<br>• Return Checked Out Tools |
| 16 | May. 11 (Friday) | • **Last Day of Class**<br>• Team Presentations | • Oral presentations<br>• Finished Prototypes avail. |

**THIS SCHEDULE IS SUBJECT TO CHANGES DEPENDING ON CIRCUMSTANCES DURING THE SEMESTER**

**Posted dates are Wednesdays unless specified.**

**All assignments are due at the beginning of class unless changed by Instructor.**