

Aviation and Technology Department
San José State University **College of Engineering**
Course Syllabus for Tech 190A: Senior Project I, Fall 2016

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Office Hours:	Tues-Thurs mornings by appointment only.
Class Days/Time:	Tech 190A lecture: TR 1:30-2:15 Tech 190A labs: TR 3:00-5:45
Classroom:	Tues IS 117 (R. Werkman), Thurs IS 119 (V. Hageman)

Catalog Description

TECH 190A: Senior Project I

Description: Half of one-year senior team design projects. Professional Development and Proposal preparation with feasibility plans, specifications, oral/written reports, and career and professional seminar participation. Project proceeds over two semesters from problem definition and design to validation, prototype construction, and testing.

Prerequisites: Completion of major lower division requirements, senior standing, and consent of instructor. Misc/Lab: 2 hrs lecture/3 hrs lab

TECH 190B: Senior Project II

Description: Second half of one-year senior team design projects carried out under faculty supervision. Review, construction, testing, and evaluation of the design from Tech 190A culminating in demonstrations and written and oral presentations to faculty and peers.

Prerequisite: TECH 190A with a C or better Misc/Lab: 1 hour lecture/6 hours lab

Course Overview and Purpose

Tech 190A/B Senior Projects is 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 program into a successful team project that reflects all the knowledge and skills of the team members. The Senior Project Course sequence is also designed to offer students an interdisciplinary experience involving both manufacturing systems and computer, electronics, and network technology as they work to complete their project. 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 190A: The first class in the sequence will focus strongly on professional development and understanding the careers you are likely to follow. For the year-long project, you will work on project proposal preparation with feasibility plans, and specifications. There will be in-class lectures with activities, homework and activities outside class, oral/written reports, and career and professional seminar participation. Students must have access to high speed internet, a computer, access to Canvas, the SJSU learning management software, and basic word processing and spreadsheet software (Word and Excel or equivalent).

You are expected to bring to this course all the knowledge and skill you have gained in your studies in the major and the business minor, along with skills in communication and teamwork, to develop a valuable and well defined project plan.

Technology career-minded students entering the workforce are faced with many challenges, including:

- New and changing technologies and trends
- Economic, government, and social factors affecting industry
- Competition for jobs and global trade policies
- Increased need for competent skill sets of hires
- Ethical challenges in the workplace
- Soft skill development
- Emerging leader and managerial skill development
- On-going education and training
- Use of online tools, social sites, etc. to review industry trends but also to review you as a potential job candidate

We will touch upon these topics via lecture, discussion, class readings, and/or guest speakers. Course work in this class will also focus on some of these topics.

Course Goals

A complete inventory of Student Learning Outcomes and their relation to accreditation standards is provided at the end of this course syllabus.

The overall goals for the 190A/B course sequence are to:

1. Provide a capstone experience in design to meet an identified need or problem, from concept to fabrication and validation of the final product.
2. Familiarize students with general industry practices, such as planning, budgeting, part procurement, fabrication, assembly, and functional testing.
3. Develop students' creative abilities in solving open-ended design problems.
4. Develop students' engineering judgment as well as their confidence in making and accepting responsibility for design decisions.
5. Develop students' oral and written communication skills necessary to describe the assumptions, methods, and results of applied engineering analysis, synthesis, and decision making associated with their design.
6. Make students aware of the importance of teamwork in the design of products, as well as provide them with an opportunity to develop team and leadership skills.
7. Develop students' understanding of professional practices, engineering ethics, as well as global and societal issues.

Laboratory Access

Projects are expected to involve activities and lab work related to both CENT and MFGS knowledge and skills; thus the two labs IS 117 and 119 will be available to this class. The schedule is: IS 117 (CENT, Tuesdays 1500-1745) and 119 (MFGS, Thursdays 1500-1745). You are expected to use the labs as needed during these hours to conduct work for your projects. You may use either or both labs at any time they are available, following correct lab safety guidelines at all times. Under unusual circumstances you or your group may need access to one of the labs at other times. Permission is needed: you will need permission ahead of time and also to announce yourselves to the instructor in the lab, to make sure your activities will not interfere with the class instruction underway.

- PLEASE NOTE that CENT students who have not taken Tech/ME 41 will be at a disadvantage in the manufacturing labs (IS 119, 122, E101). Such students may not operate moving machinery or tools without prior training, EVEN if they think they know how to. This subject must be discussed and resolved within each group.
- Students who are not available during the alternate lab times due to employment responsibilities or another class must work out with their group how the group will accomplish the necessary activities in each lab.

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.

Required Textbook and Other Readings: There is no required textbook. Class notes and other materials may be found on the course website.

Course Requirements

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. You must 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.

Group Work: Study groups are encouraged for all course activities. However, typically, Career and Professional Development work and assignments are done individually, and Senior Project work is done in teams.

Career and Professional Development and Analysis

1. Career Exploration and learning about potential careers
2. Self-Assessment and inventory of skills and knowledge
3. Analysis of needs: what do you need to bring your skills and knowledge to match your preferred career choices?

A significant part of the course for the Fall semester is oriented toward helping you explore your career goals and expectations, analyzing your strengths and weaknesses with respect to those goals, and developing plans, including work in this course sequence, to develop toward those goals. To this end you will undertake a Job Title analysis, an inventory of your own skills and knowledge with respect to the identified job title, and work on means to both develop yourself (a study plan) and to market yourself for that career goal, including resume development and job interview preparation.

Topics important to graduates are discussed including technology industry trends, significant current developments, survival strategies, and long-range forecasts. In addition to other required course materials, this class may incorporate guest speakers from the networking/electronics and manufacturing industries. The format for this class may include both on-line and in class discussions and exercises.

Silicon Valley Leadership Symposia: Students must attend and report on at least five of these presentations, which are scheduled regularly on Thursdays from noon to 1 pm. A link to the series is: <https://engineering.sjsu.edu/our-college/events/silicon-valley-leaders-symposium>. Alternately, students may propose attending a different technical presentation or workshop in lieu of a symposium. Such alternates must be approved at least two weeks prior to the event.

Career Dev. Timeline and Grading:	date due	% of career grade
Determine eligibility and register with Career Center	9/1/16	CR/NC

Job Title and description:	9/13/16	10%
Symposia / alternate reports (starting)	9/20/16 (every 2 weeks)	10%
Skills and knowledge inventory	9/22/16	10%
Resume Draft 1	10/4/16	10%
Career Development plan	10/11/16	10%
Resume Final	11/8/16	10%
Professional Portfolio, Draft 1	11/29/16	40%

The Senior Project

Groups: Teams may be self-formed, or may be assigned by the instructor, will have at least 4 students and no more than 8 students, and must include a balance of students from CENT and MFGS concentrations. All students in each group will participate in all presentations in order to receive credit for their contributions to their group project. This participation must be evenly balanced between the group members. The members of each group will also evaluate each other's performance in the group work as part of the class evaluation for each stage in the class.

The class may consolidate into larger groups after the initial proposal reviews (October 6), with the approval of the instructor. Approval will be based on clarity and sophistication of project. Each group will set its own organizational structure. *One of the projects may (or may not) be entered in a Spring 2017 intercollegiate competition by the SJSU student chapter of SME.*

1. Each student must work with their team to develop a senior project plan, and carry it out:
 - a. Engage/participate successfully in a team project, including participation in weekly meetings with project mentors and team members.
 - b. Demonstrate attention to punctuality and sensitivity to time requirements
 - c. Complete all deliverables by the due dates specified by your instructor
 - d. Participate in project reviews and presentations.
 - e. Submit assignments and reports on time.
2. Each team is required to deliver:
 - a. Project abstract
 - b. Project plan
 - c. Project documentation and presentation

The primary focus of the 190A/B course sequence is development of a senior project. Your team will develop a **comprehensive product proposal** involving product definition, description, design, marketing, production planning, first article development, and development of a working prototype. Proposals must receive the written approval of all three instructors (Bates, Werkman, and Hageman) and each project must be prepared for presentations at several milestones in the class.

Your team will conduct a process of brainstorming and proposal development. With your teacher's approval, one or two of the product ideas may be developed as possible class or large group projects. The main criteria for selection will be 1) Sophistication: the project reflects and utilizes a suitable range of design, manufacturing, and electronics/control processes for senior students in this program, and 2) Do-ability: the project is clearly possible to complete given available materials and student skillsets during the two semester Tech 190A-B sequence, and within a reasonable budget. Other criteria are important as well and will be discussed in class.

Project Timeline and Grading:	date due	% of project grade
Initial project proposal ideas:	9/8/16	10%
Revised project proposal:	9/29/16	15%
Initial drawings and BOM:	10/20/16	10%

Production and Prototype planning: (to include fiscal analysis)	11/3/16	15%
Complete project documentation:	11/22/16	30%
Project presentation:	12/6 & 8/16	20%

The completed project documentation report shall be 8 to 12 pages in length, not including appendices, drawings, and sample printouts, and shall conform to agreed-upon class format. With additional materials and appendices, reports may extend to 20 to 50 pages. However, **conciseness** is a virtue and you will be graded on that as well as other criteria.

The comprehensive **oral presentation** of the project with appropriate visual aids will take place in early December. The purpose is to give you experience in analyzing, organizing, writing, and presenting information on current manufacturing methods.

Deliverables for Senior Project, semester one.

Deliverables for various points in the project development include: Ideation sketches and notes, CAD drawings of selected product, bills of materials, process planning worksheets, equipment/processing list, materials, components, and suppliers list, market study including analysis of similar products and indicators of demand for product, manufacturing analysis including notes on sustainable processing and operations, and fiscal analysis showing estimated costs per article for different production runs. Where possible a prototype (functional, if possible) is expected to be included with the presentation.

Grading Policy

Senior Project (see above list of reports and deliverables)	50%
Professional and Career Development (see above list of reports and deliverables)	50%

A+ : > 94	A : 90 - 94	A- : 85 – 89
B+ : 80 – 84	B : 75 - 79	B- : 70 – 74
C+ : 65 - 69	C : 60 - 64	C- : 55 – 59
D+ : 50 – 54	D : 45 - 49	D- : 40 – 44
F : < 40	(0.5 - 0.9) = 1	(0.1 - 0.4) = 0

CANVAS course website: A CANVAS course website is used to distribute class materials, schedule class activities, and possibly host on-line discussion. This website is moderated by the instructors. You are automatically enrolled in the web shell when you enroll in this class. You must learn to access and use the CANVAS shell effectively.

Policy on Exams and Tests: There are no makeup assignments, reports, in-class tests or exams. Exams 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.*

University Policies

Academic integrity statement (from the Office of Student Conduct and Ethical Development):

Your own commitment to learning, as evidenced by your enrollment at San José State University, and the University’s Academic Integrity Policy 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 policy on academic integrity can be found at http://sa.sjsu.edu/student_conduct.

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](http://www.drc.sjsu.edu/) (DRC) at <http://www.drc.sjsu.edu/> to establish a record of their disability.

Senior Projects Course ~ Semester Schedule D R A F T– Fall 2016

Silicon Valley Leadership Symposia, Thursdays from noon to 1 pm in Engr 189, per schedule:

<https://engineering.sjsu.edu/our-college/events/silicon-valley-leaders-symposium>

This course schedule is subject to change with due notice

Week	Date	Topics, Readings, Assignments, Deadlines
1	08/25	Class orientation and outcomes discussion, group formation. Assignment: identify cutting edge technologies and trends for discussion. Due 9/6
2	08/30	Career identification and analysis Project development process, assignments Due 9/1: Determine eligibility and register with Career Center http://www.sjsu.edu/careercenter/about-us/eligibility/index.html
3	09/06	<i>(Labor Day is Monday, 9/5. Campus closed)</i> Professional Portfolios, resumes, etcetera Due 9/8: Initial project proposal ideas (group) SLVS: Joe Pinto, Senior Vice President, Technical Services, Cisco Systems
4	09/13	Project Planning, Requirement Engineering and Design for Quality Due 9/13: Job Title and description, including input from Dictionary of Occupational Titles and from active want ads.
5	09/20	Feasibility analysis and Economic Evaluation Due 9/20: First SLVS or alternate report Due 9/22: Skills and knowledge inventory for Career goals. SLVS: Tayloe Stansbury, Exec. Vice President & Chief Technology Officer, Intuit Inc.
6	09/27	Project Teamwork. Due 9/29: Revised project proposal, single idea. 9/29, Job & Internship Fair , Business, Gov't & Nonprofit, noon to 4 pm, SU Ballroom SLVS: Dan'l Lewin, Corporate Vice President, Technology and Civic Engagement, Microsoft
7	10/04	Tuesday: Product Life Cycle and Project Quality Management Thursday: Project reviews, option to consolidate (class discussion and activity) Due 10/4: Resume, Draft 1 10/4, 10/5 (gr) Job & Internship Fair , Engineering & Science, noon to 4 pm, Event Center
8	10/11	Effect of Engineering Design Changes on production cost and schedule Due 10/11: Career Development Plan
9	10/18	Meet with project advisor. Due 10/20: Project drawings and BOM SLVS: Joanne Moretti, General Manager Radius Innovation and Development; Chief Marketing Officer, Jabil
10	10/25	TBD SLVS: Laura Ipsen, Senior Vice President and General Manager, Oracle Marketing Cloud, Oracle
11	11/01	Life-Long-Learning with Class Exercises Due 11/3: Project: Production and Prototype planning SLVS: Hewlett-Packard Inc. Executives Panel
12	11/08	TBD Due 11/8: Resume, Final SLVS: Ana Pinczuk, Exec. Vice President & Chief Product Officer, Veritas Technologies
13	11/15	Project Presentation with Case Studies

Week	Date	Topics, Readings, Assignments, Deadlines
		Meet with project advisor SLVS: Qi Lu, Exec. Vice President, Applications and Services Group, Microsoft
14	11/22	Professional Ethics with Class Exercises Due 11/22: Complete project documentation
15	11/29	<i>Thursday: Project Presentations possible early start <u>if needed</u></i> Due 11/29: Professional Portfolio Draft 1 SLVS: Paul Markovich, President and Chief Exec. Officer, Blue Shield of California
16	12/06	Project Presentations (Tuesday and Thursday per schedule)
	12/13	Last class meeting. Review, Self-evaluation
Final	TBA	Final exam schedule: http://info.sjsu.edu/static/catalog/final-exam-schedule-fall.html

Student Learning Outcomes and their relation to accreditation outcome measures.

By the end of the course, a student should be able to:

*[from **Design Skills** (ABET outcome B, C, E, K)]*

1. Analyze, design, and implement a system, device or component based on a set of established requirements.
2. Develop a complete set of functional specifications the design solution must meet.
3. Generate solution concepts and select the most promising design concept using structured methodologies
4. Develop design models and/or drawings for prototype and final design components
5. Procure, fabricate, and assemble prototype and final design hardware
6. Evaluate, test, and analyze prototype and final design components and systems
7. Identify future modifications and improvements that could be made to the design based on test data
8. Write a project report and create presentations

Communication Skills (ABET outcome G)

9. Write high quality design reports (i.e., using correct language and terminology, correct technical information, and professionally prepared graphs and tables).
10. Give clear, informative, technically correct oral presentations using professionally prepared visual aids

Team Skills (ABET outcome D)

11. Use various communication methods and skills to communicate with their teammates and classmates to conduct their practice-oriented senior projects.

Ethical Issues (ABET outcome F)

12. Identify workplace and professional situations which can lead to ethical dilemmas.
13. Demonstrate understanding of and the ability to apply professional codes of conduct.

Global and Societal Issues (ABET outcome F)

14. List several examples of global and societal issues related to their project, and articulate a problem statement *or* position statement for each.
15. Identify possible solutions to these global and societal problems, as well as any limitations of such strategies.
16. Evaluate and describe accurately the environmental impact of your product.
17. Evaluate and describe accurately any environmental and economic tradeoffs of your product.