

San José State University
Mechanical Engineering Department
ME 180 Section 89, Independent Study Project, Fall 2022

Course and Contact Information

Instructor(s):

Section 89: Prof. Harry Quackenboss
Course coordinator: Prof. Vimal Viswanathan

Contact Information Prof. Quackenboss: harry.quackenboss@sjsu.edu, 408-256-2404
Prof. Viswanathan: vimal.viswanathan@sjsu.edu, 408-924-3841

Office Hours Prof. Quackenboss: via Zoom by appointment

Class Days/Time: TBD

Prerequisites: Participation in the Spartan Racing team and department consent

Course Description

One term project carried out under faculty supervision. The project will proceed from problem definition to analysis, design and validation, and experimentation including possible construction and testing.

Course Format Technology Intensive, Hybrid, and Online Courses

This class requires the use of Canvas, so you will need access to the internet. Most, if not all, assignments during the semester will require the use of a computer for word processing, spreadsheets, presentations, computational analysis, CAD drawings, etc. Electronic communication with your instructor and teammates is also required.

Recording Zoom Classes

This course or portions of this course (i.e., lectures, discussions, student presentations) may be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas. The recordings will be deleted at the end of the semester. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording). Students are not allowed to record without instructor permission. Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings.

Instructor Materials

Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodation or assistive technology due to a disability to notify the instructor.

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the [ME180 webpage](#) and/or on [Canvas Learning Management System course login website](#) at <http://sjsu.instructure.com>. You are responsible for regularly checking with the messaging system through [MySJSU](#) on [Spartan App Portal](#) <http://one.sjsu.edu> to learn of any updates.

Course Goals

The overall goals for the course are to:

1. Provide students experience in research, modeling, analysis, designing, building and testing of systems and components of mobility and vehicle systems in support of participation in SAE International's Collegiate Design Series Formula SAE/Formula Electric ("Formula") competitions.
2. Familiarize students with general industry practices for product engineering, such as planning, scheduling, budgeting, materials and part procurement, fabrication, assembly, and functional tests.
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 engineering analysis, synthesis, and decision-making associated with their design.
6. Instill awareness of the importance of tradeoffs in the design of products, and conflicting objectives of cost, feature, and schedule.
7. Develop students' understanding of professional practices, and standards, as well as global, environmental, and societal issues relevant to mechanical engineering.

Course Learning Outcomes (CLO)

By the end of the course each student should be able to:

Design Skills

1. Apply product development process from analysis of current, improved or different designs components or systems in support of the Formula SAE/Formula Electric (Formula) program requirements
 - a) Depending on the project, emphasis may be on applied research/analysis of alternative approaches for potential application in a current or future vehicle, or different product use cases
 - d) Selecting the most promising design concept using structured methodologies
 - e) Developing design models and/or drawings for prototype and final design components
 - f) Evaluating, testing, and analyzing prototype and final design components and systems
 - g) Where applicable, procuring, fabricating, and assembling prototype and final design hardware
 - h) Identifying future modifications and improvements that could be made to the design based on test data
 - i) Writing a project report and making presentations
2. Develop a schedule, and meet schedule and, where applicable, budget constraints.

3. Interact effectively with Formula SAE/Formula Electric team members, vendors, suppliers, and shop personnel.

Communication Skills

4. Prepare and present clearly organized and technically sound design reports, consistent with Formula SAE/Formula Electric design competition processes including Conceptual Design Review (CDR), Detailed Design Review (DDR) and Formula Design Event (i.e., using correct language and terminology, correct technical information, and professionally prepared graphs and tables).

Textbook

None

Other Readings

Links to additional online readings will be posted online.

Course Requirements and Assignments

ME 180 involves working with the Formula team leadership and members to positively contribute to the overall team effort. You will define your project and its specifications and go through the phases of analysis and design. Successfully completing. Scheduling and spreading out your work evenly throughout the semester is very important. You must attend all sessions scheduled with your instructor. Assignments are described on the next page.

Proposal and Progress Reports

The project proposal outlines the deliverables and specifications for your project. Follow the guidelines on the ME 180 website unless otherwise noted by your instructor. Progress reports will be required by individual instructors, and they will provide you with information about the required format and due dates.

Presentations

Students will be required to submit documentation and conduct presentations to an audience including peers, faculty members, and invited guests in accordance with the milestones in the table below, and with format and time frame consistent with the Formula team's CDR and DDR schedule. Since this is a new course, the preparation and delivery are subject to change, but it is anticipated that the original project definition, the CDR and DDR presentations will be evolving working documents that get updated with information as each student's project progresses.

Materials Retention and Use

Consistent with other design and analysis documentation associated with Formula, copies of materials may be retained and any analyses, concepts, ideas and/or designs may be made available to and used freely by current and future SJSU Formula teams and successor organizations.

Individual Writing Assignments

In addition to the CDR and DDR presentations, a final report will be required. The format of the final report will be provided by approximately the end of October 2022, and will be aligned with the components that comprise the relevant DDR presentation content for the project.

Final report (Final Evaluation)

The final report format will be provided by the end of October 2022. Consult your instructor to see which sections they want you to complete. The final report serves as your final evaluation for the course, per university policy.

Individual Performance/Participation Evaluation

Your instructor will give you a score for your individual team contributions. Items that factor into this score may include team meeting participation, performance in presentations and the final report

Expected time commitment

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course-related activities including but not limited to internships, labs, clinical practice. Other course structures will have equivalent workload expectations as described in the syllabus.

Grading Information

This course will be graded credit/no credit. The instructor will determine if project deliverables have been met, and thus credit should be received for the class. The instructor will submit the course grade of credit or no credit before the first deadline to submit the grade

Unless otherwise noted, no late work will be accepted according to the rules established by each section instructor.

Classroom Protocol

Each student is expected to meet with the instructor to discuss their project a minimum of once every two weeks. Reasonable efforts will be made to accommodate each student's class and work schedule and participation in recurring Formula-related meetings and events. It is the responsibility of each student to notify the instructor promptly if they will be unable to attend a meeting and to reschedule as soon as practicable.

University Policies

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo) (<http://www.sjsu.edu/gup/syllabusinfo>), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

ME 180/Section 89 Milestones

Milestones are subject to change with fair notice via email. Assignments are due by 11:59 pm Pacific Time unless otherwise noted.

Week	Date	Topics, Readings, Assignments, Deadlines	Assignments Due
3	Sept 7	Individual sessions concerning project proposals	Preliminary Proposal due 9/7
4	Sept 14	Submission of final project proposals for approval by Sep 12	Submission to instructor on or before Sept 12
10	Oct 26	Conceptual Project/Design Review (CDR) Presentation	Dates aligned with Formula CDR schedules
15	Nov 30	Final Project/Design Review (DDR) Presentation	Dates aligned with Formula DDR schedules
16	Dec 6 Last day	Final project report and individual performance evaluation forms due by Dec 6 (Tuesday) at midnight	December 6

ME 180/Section 89, Independent Study Project Course Schedule, Fall 2022

Schedule is subject to change with fair notice via email. Assignments are due by 11:59 pm Pacific Time unless otherwise noted.

Week	Date	Topics, Readings, Assignments, Deadlines	Assignments Due
1			
2	Aug 31		
3	Sept 7	Individual sessions on project proposals	Preliminary Proposal due 9/7
4	Sept 14	Individual sessions Discussion on technical presentations with your instructor	Final Proposal Submission Due Sep 12
5	Sept 21	Individual sessions	
6	Sept 28	Individual sessions Note: Get started on your CDR	
7	Oct 5	Individual sessions	
8	Oct 12	Individual sessions: Project Report Preparation discussion	
9	Oct 19	Individual sessions	
10	Oct 26	Final Report Format Individual sessions	
11	Nov 2	Individual sessions.	
12	Nov 9	Individual sessions	
13	Nov 16	Individual sessions and DDRs (aligned with Formula)	
14	Nov 23	Non-instructional day (campus open, but no class)	
15	Nov 30	Individual sessions	
16	Dec 6 Last day	Final project report and individual performance evaluation forms due by Dec 6 (Tuesday) at midnight	12/6 (Tues)