ME 490A: Engineering Design: Senior Project I

SDSU Fall 2014

Dr. C. Alex Simpkins

Class and Office hrs

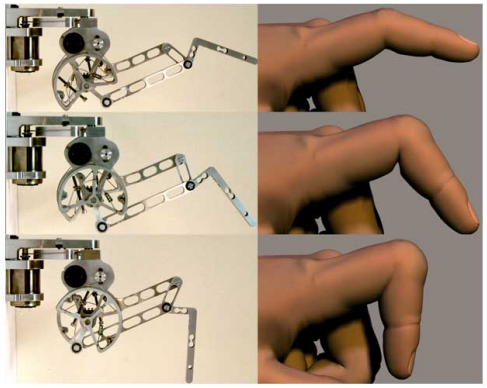
- Instructor: C. Alex Simpkins, Ph.D., Lecturer
- Office: TBA
- Email: casimpkins@gmail.com
- Office Hrs: Tu 12-12:50, Th 4-5, Fr 2-3, *Starbucks Student Union
- Lecture & Lab: THU 1:00 – 3:50 PM, Room IT-101
- Website:
  - **http://casimpkinsjr.radiantdolphinpress.com/pages/me490a_fa2014**
  - **Blackboard**

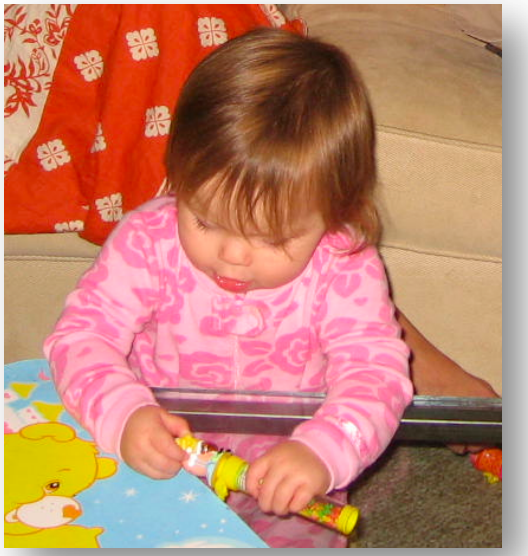
INSTRUCTOR

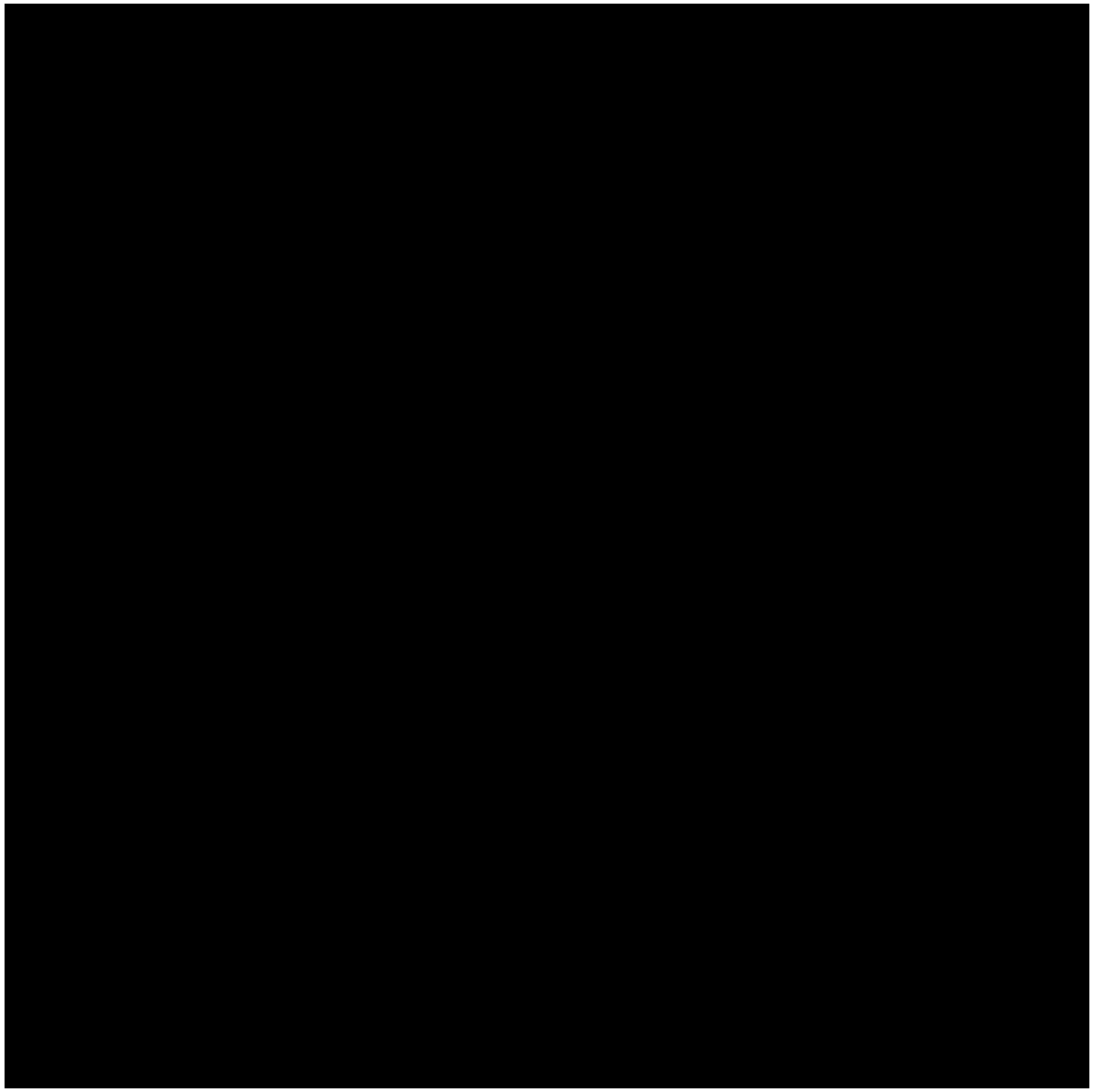
- Dr. C. Alex Simpkins
  - Lecturer in Mechanical Engineering
  - Consultant, CEO RDPRobotics, LLC
- Teaching Expertise
  - Mechanics, Dynamical systems and control
  - Design, mechatronics, cognitive science/ psychology/neuroscience

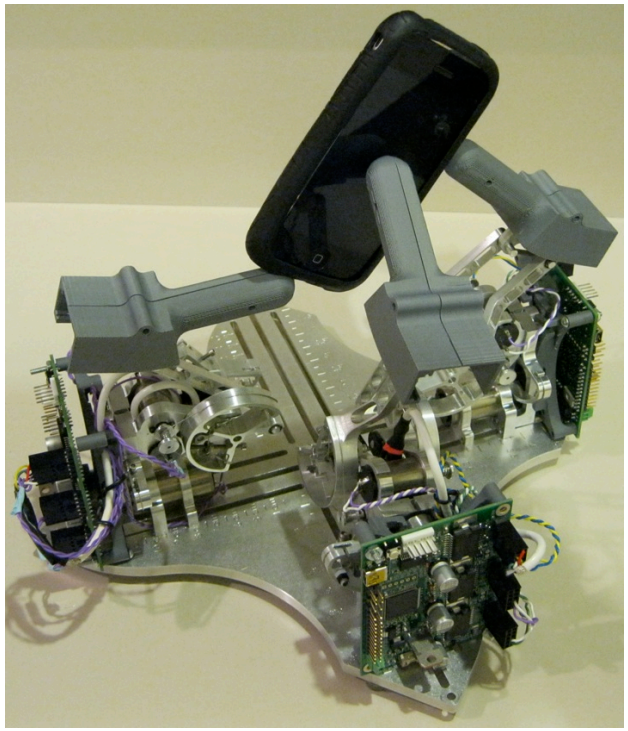
INSTRUCTOR

- Research
  - Biomimetic robotics
  - Locomotion/manipulation
  - Learning systems
  - Haptics and vibration
  - System identification and robust and optimal control
  - Rapid prototyping, design and embedded systems
  - Etc☺







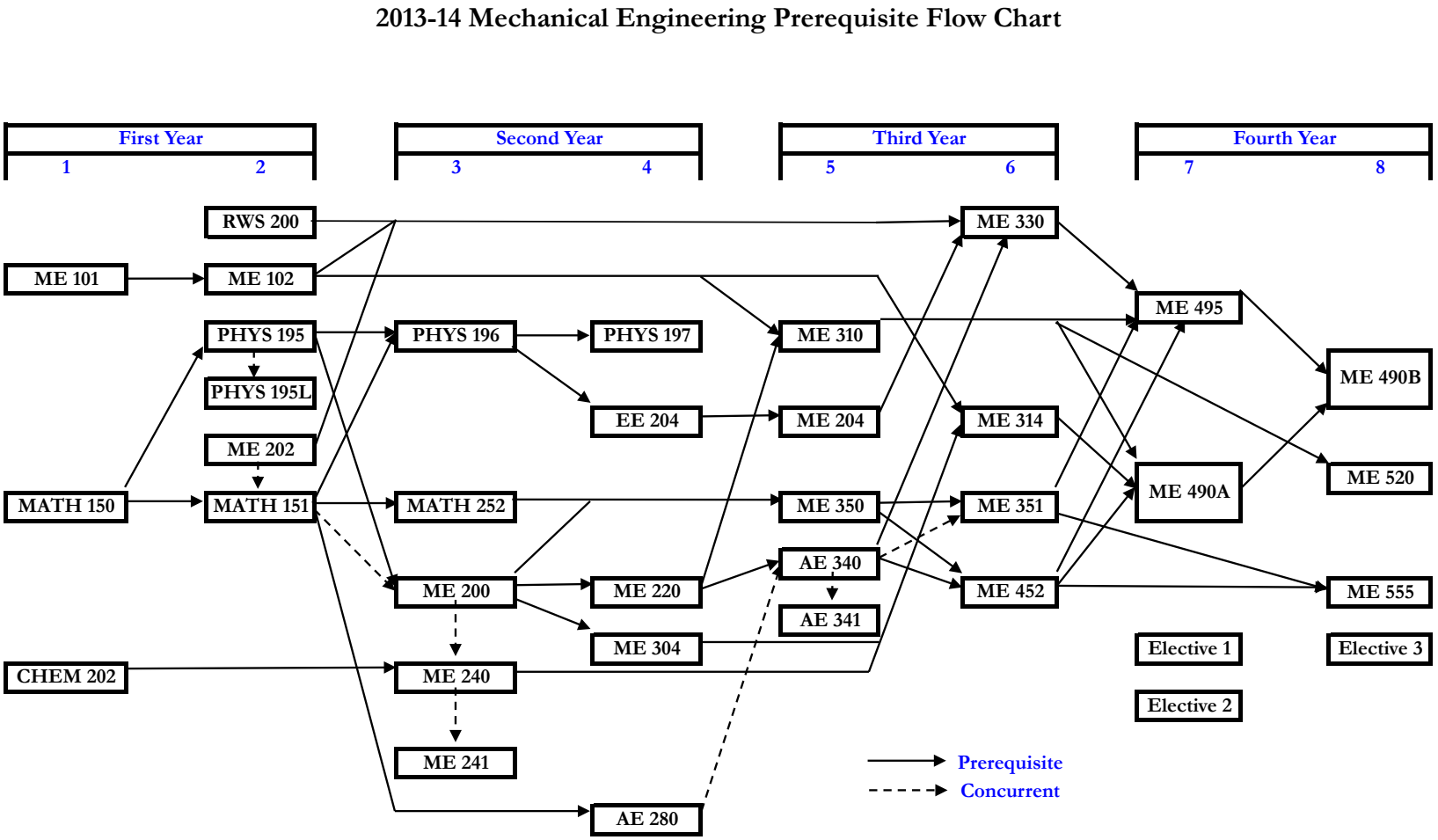


Course description:

- **Course Catalog**: Applications of engineering principles and design techniques to the designing, building, and testing of an engineering system. A single project is completed in this two-course sequence and is judged completed upon presentation of an oral and written report. In addition, issues related to ethics and engineering practice are discussed.
- **Additional**: This course is a study in the project-based approach to engineering design. Students will learn how to work effectively on teams and apply conceptual design methods and project management tools to a client-initiated design project. The students will participate in a "real world" design project.

Prerequisites:

- ME310, ME314, ME452



Adding procedure

- Students who enroll in ME 490 A and ME 490 B must come into the ME Office and obtain a schedule number and /or add code to register for the class.
- If registered for the class in summer, they still need to come into the office and follow the rule.
- Must
  - update their master plan with courses and grades
  - obtain a signature from their advisor
  - bring master plan to ME Office (Mon-Fri, 8:00-4:30, closed 12-1 for lunch)
  - show Red ID card
  - sign the class roster

Student learning outcomes:

- To apply engineering principles and design techniques to the designing, construction, testing evaluation and optimization of an engineering system.

Program outcomes:

- (1) An ability to apply knowledge of mathematics, science, and engineering.
- (2) An ability to design and conduct experiments, as well as analyze and interpret data.
- (3) An ability to design a system, component, or process to meet desired needs.
- (4) An ability to function on multi-disciplinary teams.
- (5) An ability to identify, formulate, and solve engineering problems.
- (6) An understanding of professional and ethical responsibility.
- (7) An ability to communicate effectively.
- (8) The broad education necessary to understand the impact of engineering solution in a global and societal context.
- (9) A recognition of the need for an ability to engage in life-long learning.
- (10) A knowledge of contemporary engineering issues.
- (11) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- (12) Have the ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations) to model, analyze, design, and realize physical systems, components or processes.
- (13) The ability to work professionally in both thermal or mechanical systems areas.

Grading policy:

- Team progress report and presentation = 30%;
- Project definition report = 10%;
- Project poster = 10%;
- Final presentations = 20%;
- Final report = 10%;
- Team peer evaluation = 10%;
- Attendance = 10%;
- 90-100% (A/A-); 80-90% (B/B-); 70-80% (C/C-); 60-70% (D/D-); Below 60% (F)

Peer Seminars/Presentations

- Each team will be assigned a “professional seminar/presentation” to be presented to the entire class. You will present the progress of your project during the semester.

In-class Meeting Topics:

Week	Date	Lecture (1:00 – 1:50)	Lab – Team presentation (2:00 – 2:50)	Lab – Team meeting (3:00 – 3:50)
1	8/29	Introduction	Project selection and team member formation	Project selection and team member formation
2	9/5	Concept design I	Project selection and team member formation	Project selection and team member formation
3	9/12	Concept design II	Progress presentation – Group I	Team meeting – Group I
4	9/19	Concept design III	Progress presentation – Group II; Project definition report due	Team meeting – Group II
5	9/26	Actuator design I	Progress presentation – Group III	Team meeting – Group III

6	10/3	Actuator design II	Progress presentation – Group I	Team meeting – Group I
7	10/10	Actuator design III	Progress presentation – Group II	Team meeting – Group II
8	10/17	Actuator design IV	Progress presentation – Group III	Team meeting – Group III
9	10/24	Sensor design I	Progress presentation – Group I	Team meeting – Group I
10	10/31	Sensor design II	Progress presentation – Group II	Team meeting – Group II
11	11/7	Sensor design III	Progress presentation – Group III	Team meeting – Group III
12	11/14	Controller design I	Project poster due; Poster presentation – Group I, II, III	Poster presentation – Group I, II, III
13	11/21	Controller design III	Final report due; Team peer evaluation – Group I, II, III	Team peer evaluation – Group I, II, III
14	11/28	Thanksgiving Day recess		
15	12/10 (Tuesday)	Final presentation (9:00am-1:00pm)	Final presentation; BioCenter	Final presentation; BioCenter
	12/?	Joint Senior Day with COE Department (?)	Alumni Hall (?)	

Senior project definition

- **TEAM MEMBER**
- Name
- Email address
- Phone number
- Photo
- **SPONSOR**
- Contact person email address
- Company/Faculty/Agency/ etc. Name
- Contact person Phone number
- **FACULTY ADVISOR**
- ME faculty professor
- Email address
- **PROJECT DESCRIPTION**
- Description of the project to be engineered
- Reason for the project
- **ESTABLISHED WORK**
- Research program or other context for the project
- State of development
- Work to be utilized
- Technology to be utilized
- **SCOPE OF WORK**
- Anticipated research, analysis, design, fabrication, testing, special documentation
- **DELIVERABLES**
- Project documentation, reports, prototype, test data.
- **TARGET DATES**
- Important project dates
- **FUNDING**
- Source of funding
- Amount available