

ME / IE 497 SAE Section Syllabus

Fall 2013

Instructors

Dr. Robert Paasch

Teaching Assistants

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SAE Graduate Students

Robert Culbertson (Rogers 110 - robert.culbertson@global-formula-racing.com)

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Credits: Fall: 4

Winter: 4

Day/Time: Fall: TR 4:00–5:50 pm

Winter: MW 4:00–5:50 pm

COURSE OVERVIEW

IE/ME 497 & IE/ME 498 (MIME Capstone Design), the School of Mechanical, Industrial and Manufacturing Engineering's capstone design sequence, gives MIME seniors the opportunity to integrate the engineering knowledge and experience they've gained throughout their undergraduate program and apply their skills to work on real-world engineering projects. To complete these projects, teams of students (1) work with sponsors, perform analyses, and conduct research to develop requirements for a mechanical or industrial system or solution to a mechanical or industrial engineering problem; (2) design the system or solution methods; (3) implement a prototype, model, or method according to the system or solution design; (4) operate the prototype, model, or method; (5) evaluate the prototype, model, or method with respect to the project requirements; (6) document the process, products, and results; and (7) manage the

projects.

Each student team works on a distinct project. In addition to being supervised and evaluated by one of the course instructors, each team works with a representative of the project's sponsor or customer ("sponsor mentor") and a MIME advisor who provides technical guidance and consulting. In addition to their technical roles, the sponsor mentor and MIME advisor evaluate student performance and provide input to the course instructors for grading purposes. For some projects, the sponsor mentor and MIME advisor may be the same person. In rare cases, one of the course instructors may fill all three roles.

MIME Capstone Design is also the School of MIME's designated writing-intensive course sequence that satisfies the university's WIC requirement. Course participants complete a variety of written and oral assignments that support the engineering design process, further their engineering communication skills, and otherwise prepare them for success in their chosen profession. In completing these assignments, students are expected to review and respond to one another's writing in a professional and collegial manner; revise individually and collaboratively produced drafts; and use informal writing techniques to explore and solve engineering analysis, design, and evaluation problems.

COURSE-SPECIFIC LEARNING OUTCOMES

At the completion of MIME Capstone Design, students will be able to perform the following tasks:

1. Starting from a sponsor's statements of need, work with the sponsor, perform appropriate research and analyses, and apply relevant engineering standards to develop formal requirements for a mechanical system, an industrial system, or the solution to a mechanical or industrial problem.
2. Considering multiple alternative approaches, design and implement a prototype, model, or method to meet those requirements by correctly applying appropriate engineering principles.
3. Operate or implement the prototype, model, or method and evaluate the results against the requirements using objective performance measures.
4. Plan and manage the project so as to use team resources efficiently and meet project requirements on time and on or under budget.
5. Recognize and constructively address ethical dilemmas that may arise and potential adverse environmental, safety, health, and social impacts.
6. Collaboratively produce written and oral reports that effectively communicate project

information to target audiences—i.e., that are at the appropriate technical level for these audiences and follow disciplinary conventions of usage, vocabulary, format, and citation.

7. Function effectively on a team, contributing to all major aspects of the design, implementation, and testing of an engineering project.

ABET PROGRAM OUTCOMES

In developing your skills in product design and development, MIME Capstone Design directly supports ABET Program Outcome c, “Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.”

In focusing on the communication and teamwork skills needed for producing formal engineering reports and preparing and delivering professional-quality oral presentations, thinking critically about local and global design issues, and working collaboratively on engineering projects, this course sequence also supports ABET Program Outcome d, “Ability to focus on multidisciplinary teams,” and g, “Ability to communicate effectively.”

Finally, the content of this capstone design course sequence also supports ABET Program Outcome f, “Understanding of professional and ethical responsibility” and i “Recognition of the need for, and ability to engage in, lifelong learning.”

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Students will

1. Develop and articulate content knowledge and critical thinking in the discipline through frequent practice of informal and formal writing.
2. Demonstrate knowledge/understanding of audience expectations, genres, and conventions appropriate to communicating in the discipline.
3. Demonstrate the ability to compose a document of at least 2000 words through multiple aspects of writing, including brainstorming, drafting, using sources appropriately, and revising comprehensively after receiving feedback on a draft.

POLICY REGARDING STUDENTS WITH DISABILITIES

Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.

POLICY REGARDING STUDENT ACADEMIC DISHONESTY AND CONDUCT

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MACHINING LAB CERTIFICATION

For students completing senior projects with significant mechanical design requirements, certification to work in the MIME machining lab is strongly encouraged. If you are not certified, contact Brian Jensen immediately to schedule your certification. Lack of machining lab certification is not a valid excuse for your project being over budget or behind schedule or otherwise failing to meet course requirements.

Key Deadlines

Topic	Points	Date
Team Charter & Presentation	50	Tues. 10-Oct-13
Background Report	200	Thurs. 24-Oct-13
Preliminary Proposal	200	Thurs. 14-Nov-13
Final Proposal	250	Thurs. 9-Dec-13
Project Notebook	50	Thurs. 12-Dec-13

Course Notes

1. Google will be used as the primary communication and information tool (Gmail, Google Drive, Sites, Calendar, etc.)
2. Team charter must be completed in google sites.
3. Team presentations must be completed in google presentation and embedded in google

sites.

4. Reports must be completed in google docs.
5. Assignments are expected to be properly completed and formatted by 23:59 PST on the due date.
6. Proper formatting and general writing requirements can be found in the GFR14 Senior Project and Baja 2014 Senior Project folders on the Mohr Drive, as well as in the GFR14 senior project folder on google drive
7. Assignment descriptions & grading rubrics for all reports are located as stated above. You are responsible for ensuring your assignments fulfill requirements.
8. The class will be divided into two groups
 - a. Group A: Baja and Formula management projects
 - b. Group B: All other Formula Projects
 - c. Both groups attend Group A presentation days, only Group B attends Group B presentation days

ME/IE 497 Assignment Summary

(See full Assignment Description in Senior Project folders)

Group Charter and Presentation (50 points)

- The Group Charter is a contract between you and your team members stating the expectations of each other and of the project, to be updated as the term progresses.
- Presentation should be approximately 5 min/team and--in 4 slides--present:
 - Team Goals
 - Group Member Roles and Responsibilities
 - Potential Barriers and Coping Strategies
 - Standards for Availability

Project Notebook (50 points)

- Your senior project notebook is a log of all your engineering work which is not on google
- You must carry your notebook with you at all times and record the results/decisions of all meetings
- Organization of the notebook is up to you
- Anything you are writing down as part of your project should be in this notebook
- Notebooks will be checked at the end of the term

Background Report (200 points)

- Follow the [Example Report template](#) through section 2.1 - Current State Analysis.
- Additional requirements in the [GFR14 OSU Project Group Report Instructions and Requirements](#).

- Graded using the [Fall 2013 ME/IE 497 SAE Grading Rubrics](#).

Preliminary Proposal (200 points)

- Follow the [Example Report template](#) through section 3 - Design Analysis, with previous sections updated per critique.
- Additional requirements in the [GFR14 OSU Project Group Report Instructions and Requirements](#).
- Graded using the [Fall 2013 ME/IE 497 SAE Grading Rubrics](#).

Final Proposal (250 points)

- Follow the [Example Report template](#) through section 4 - Design Selected, with previous sections updated per critique.
- Additional requirements in the [GFR14 OSU Project Group Report Instructions and Requirements](#).
- Graded using the [Fall 2013 ME/IE 497 SAE Grading Rubrics](#).

Weekly Presentations (100 points)

- Google Presentation should be short (5-8 min/group incl. questions) and must be done in Google Presentations, embedded in Google Sites They will include:
 - Progress made since last presentation
 - Planned progress till next presentation
 - Issues that need to be resolved on a higher level then your project group
 - Up to date schedule

Project Contribution - Subjective (150 points)

- Completion of objectives and effort put for to complete your project, as well as your contribution to the overall subteam goals
- Attendance to all the ME 306 classes and work sessions
- Completion of project management requirements (Part Evaluation Sheet, Gantt Chart, etc.) (Formula members)

2013 Fall Term Schedule

Activity / Task	Week	Date
Full Senior Project Group for SAE Team Members	1	1-Oct-13
1st SAE Class - Introduction, Project Description/Choice	1	3-Oct-13
Group Assignments, Introduction to Google, Group Charter creation	2	8-Oct-13
Team Charter Presentations in Class, GROUP CHARTER DUE	2	10-Oct-13
Individual Project Group Meetings A	3	15-Oct-13
Individual Project Group Meetings B Reading quiz!	3	17-Oct-13
Full Class: Status Presentations A	4	22-Oct-13
Full Class: Status Presentations B; BACKGROUND REPORTS DUE	4	24-Oct-13
Individual Project Group Meetings A	5	29-Oct-13
Individual Project Group Meetings B	5	31-Oct-13
Full Class: Status Presentations A; Background Reports Returned	6	5-Nov-13
Full Class: Status Presentations A -- Background Report Critique	6	7-Nov-13
Individual Project Group Meetings A	7	12-Nov-13
Individual Project Group Meetings B	7	14-Nov-13
PRELIMINARY PROPOSAL DUE	8	18-Nov-13
Full Class: Status Presentations A	8	19-Nov-13
Full Class: Status Presentations B	8	21-Nov-13
Individual Project Group Meetings (likely occur over ME348 hours also)	9	26-Nov-13
Thanksgiving!	9	28-Nov-13
Full Class: Status Presentations	10	3-Dec-13
Full Class: Status Presentations	10	5-Dec-13
FINAL PROPOSAL DUE	Finals	9-Dec-13
Project notebook due	Finals	12-Dec-13
Winter work week: Optional if your project is complete.	1st week break	16-20-Dec-13

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Winter 2013

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Key Deadlines

Topic	Points	Date
Final Report	375	Wed. 13-Mar-13

General Writing Requirements

- **The target audience for all your reports is incoming seniors of the following years.**
- **All writing is required to be completed in Google Sites.**
- All reports are expected to be properly formatted and complete by the end of the day of the day on the date of submission. (23:59 PST)
- Use **Bold** text to put **emphasis** on key statements and points. This should show what you perceive to be the most important points within text. See the Formula design report for a good example.
- **Citations should be included as [hyper-links](#) in text whenever possible.** These citations should link to papers uploaded into the Published Documentation folder in Google docs, to other Team reports that have been uploaded to the Google docs folder structure, or to credible websites. If referencing a paper or book that you do not have a digital copy of to link to, include a in-text citation, with a link to where the paper or book can be purchased if possible. ([Race Car Vehicle Dynamics](#), 1995, pg 301-5).
- [Links to Data](#) that you are discussing should also be included whenever possible.
- No Attachments nor References sections should be included at the end because all attached documents should be linked in text throughout the report.
- Google keeps a revision history for every page that includes a new revision every time you edit a page. In order for this to be useful a manual record of all the **major editing changes** to the content of the page must be kept. **All report versions as submitted** on the date are required must be documented in the form below at a minimum.

- Grading Rubrics for all Reports can be found [HERE!](#)

ME/IE 498 Assignments

1000 total course points

Final Report (375 points)

- Follow the Example Report template through Section 7 - Conclusion.
- Make all corrections and/or modifications suggested in the critique of the Final Proposal.

Weekly Presentations (100 points)

- **All Presentations should be done in Google Presentations and embedded in Google Sites** according to the [*Project Group Template](#) (Formula) / [*Project Group Template](#) (Baja).
- For every Project Group according to the Google sites structure there should be 1 presentation
- **Google Presentation should be short (5-8 min/group incl. questions).**

Key Slides:

- Progress made since last presentation
- Planned progress till next presentation
- Issues that need to be resolved on a higher level than your project group
- Smartsheet Gantt chart (navigate to current sheet in Google Sites)
- Use concrete and measurable language as much as possible. (e.g. *Part design xxxx complete*)
Avoid accomplishments and task plans that are trivial or ambiguous amounts of time. (e.g. *Called xxxxx machining, or worked on xxxxxx*)
- If you have pictures of modeling, finished parts, problems, simulation results or data analysis, **Show them, but keep discussion during presentation to a minimum.** Details can be discussed later as necessary.
- **Smartsheet Gantt chart should be kept current throughout the term** for each project group and include all critical tasks and major milestones.

Project Contribution - Subjective (150 points)

- Have you put forth a **strong effort** to complete your project within the **best of your abilities**?
- Have you worked with and helped your fellow group and team members to make the overall project successful?

Project Results - Subjective (375 points)

- All **parts** you are responsible for **have been manufactured and are on the vehicle.**
- All **process** improvements you are responsible for **have been tested and are ready to be implemented.**
- **Have you met the objectives** originally discussed in the project description/with team leaders?
- All parts you are responsible for have been kept in a reasonably updated state in the **Part Evaluation Sheet** throughout the term (Formula members).

Winter Term Schedule

Activity / Task	Week	Date
Syllabus and Deadlines; Full Class Presentations - Winter Break Progress A	1	7-Jan-12
Full Class Presentations - Winter Break Progress B	1	9-Jan-12
Individual Group Meetings A	2	14-Jan-12
Individual Group Meetings B	2	16-Jan-12
MLK Holiday - No Class	3	21-Jan-12
Full Class Meeting: TBD	3	23-Jan-12
Full Class Presentations A	4	28-Jan-12
Full Class Presentations B	4	30-Jan-12
Individual Group Meetings A	5	4-Feb-12
Individual Group Meetings B	5	6-Feb-12
Full Class Presentations A	6	11-Feb-12
Full Class Presentations B	6	13-Feb-12
Individual Group Meetings A	7	18-Feb-12
Individual Group Meetings B	7	20-Feb-12
Full Class Presentations A	8	25-Feb-12
Full Class Presentations B	8	27-Feb-12
Individual Group Meetings A	9	4-Mar-12
Individual Group Meetings B	9	6-Mar-12
Full Class Presentations A	10	11-Mar-12
Full Class Presentations B; Final Proposal Due	10	13-Mar-12