Senior Year Requirements

Senior Writing
Senior Capstone Design
**Senior Year Courses**  
(you may have already taken some of these)

<table>
<thead>
<tr>
<th>Course</th>
<th>Courses</th>
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<tbody>
<tr>
<td><strong>Senior Capstone Design</strong></td>
<td><strong>MER439/MER419</strong></td>
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<tr>
<td><strong>Senior Writing</strong></td>
<td>(1) MER487 &amp; Eng Elect 2</td>
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<tr>
<td></td>
<td>(2) MER487 &amp; MER494/5/6</td>
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<tr>
<td></td>
<td>(3) MER497 &amp; MER498</td>
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<tr>
<td><strong>Electives</strong></td>
<td><strong>MER Elect 1/ Eng Elect 1</strong></td>
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Senior Capstone Design:

An Engineering Accreditation Requirement for all accredited engineering BS programs

- **MER439** – focus on design of thermal fluid systems, four 2-week projects, small teams, teaming and team leadership experiences for all. Primarily paper design. *Offered Fall (2), Winter, Spring.*

- **MER419** – focus on design of mechanical systems. One 10-week project, large teams. Build experience. *Offered Fall, Winter, Spring.*
Senior Writing

• College Wide Requirement:
  – Senior Writing Experiences will normally involve theses, special seminars, research projects, project reports or independent studies...this course should include regular *meetings* between student and faculty member, the submission of segments or *drafts* for written response by the faculty member, and *rewrites* with written and/or oral evaluation throughout the term of the project.

• Satisfied in ME Department by: **MER487** or **MER498**
MER 487 (new course)

Ultimate Goal
Write a thesis (i.e., a final paper)
May be original research, original design or review paper
Can be coupled to a topic you study in the ME Elective course or on the team projects

Course Structure
Topic identification with primary references
Proposal & oral presentation
Sequential submission of paper sections
Incorporation of feedback from professor and peers
Final paper & presentation
Literature reviews throughout course
WS Option 1: MER 487 + Tech Elective

• ME Elective Options next year (tentative)
  – **Fall:** Spaceflight Mechanics, Solar Energy Analysis & Design
  – **Winter:** Mechatronics Design, Advanced Materials
  – **Spring:** Internal Combustion Engines, Orthopaedic Device Design & Development

• MER487 offered Spring Term (only)

• What you need to do now:
  – Start thinking about thesis topics
  – Submit Senior Writing Placement Form by 5/15/15
WS Option 2: MER 487 + Team Practicum

- HPV, Baja & SAE Aero Team Projects
  - 2-4 people per team
- MER487 offered Spring Term (only)
- What you need to do now:
  - Get your resume together
  - Interview with Team Advisor and Team Captains
  - Get hired!
  - Submit Senior Writing Placement Form by 5/15/15
WS Option 3: MER497 + MER498

- Student/Faculty independent projects (research &/or design oriented) Pre-requisites: MER333, MER311
- MER497 offered F/W  MER498 offered W/S (only)

What you need to do now:
- Talk to faculty about project ideas
- Get your resume together & put together a project proposal
- If needed, sign up to present your idea on 4/24 or 5/1

This presentation should be 3-5 minutes long and include the information such as: Specific Project Goal, Background Information, Project Tasks and Project Timeline. This presentation and your project proposal are the two chief opportunities for you to make your case for the merits of your project and to convince an adviser to select you.

- Get selected and obtain a faculty signature
- Submit Senior Writing Placement Form by 5/15/15
Seminar Schedule

4/3: Introduction to Seminar/ Team Presentations

4/9 (Thurs): Poster Previews; 4/10 (Fri) Dr. Steven Covey (St Cloud)

4/17: Faculty Project Presentations
  - Team project hires finalized.

4/24 & 5/1: Student Presentations (MER 497/8)
  - Faculty will start to select projects in initial round.

5/8: Steinmetz Symposium (No Seminar)

5/15: Justin Rodriguez (Tufts)
  - Senior Writing Placement Forms Due

5/22: Dr. Smitesh Bakrania (Rowan)
  - Faculty select projects in 2nd round and final assignments made

5/29: Post Grad Opportunities

6/5: Senior Elevator Talks
Senior Writing Placement Form

Students who plan to graduate in June, 2016 need to complete this form and return it to the department chair by May 15, 2015. Please indicate which option you will use to satisfy your senior writing requirement and obtain appropriate signatures. If you plan to enroll in MER497/8 you also need to attach a project proposal.

Note: If you plan to enroll in MER497/498 at any point during the 2015/16 academic year you must find an advisor now and complete this form. Students who do not do so will not be allowed to register for MER497 or MER498 during AY 2015-2016.

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OPTION 1:  _______MER 487 + Tech Elective

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OPTION 2:  _______MER 487 + Team Practicum (MER494/495/496)

Team:  SAE Aero  ASME HPV  SAE Baja(?)

Team Role:  

Team Adviser Name:  

Team Adviser Signature:  Date:  

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OPTION 3:  _______MER 497 + MER 498 (attach project proposal to this form)

Terms:  _____Fall/Winter  _____Fall/Spring  _____Winter/Spring

Project Title:  

Project Advisor Name:  

Project Advisor Signature:  Date:  

*******************************************************

Student Name:  

Signature:  Date:  

Academic Adviser Signature:  Date:  

Department Chair Signature:  Date:  
Team Projects

• SAE Aero – Prof Bruno
• SAE Baja – Prof Tchako
• ASME Human Powered Vehicle – Prof Ramasubramanian
UNION COLLEGE S.A.E. AERO

Who We Are/What We Do

• Society of Automotive Engineers [S.A.E.] Aero Design

• Design, build, test a remote-controlled aircraft within S.A.E. rules and regulations

• Regular Class: goal is to maximize payload capability
2015-2016 AERO TEAM

Potential Mechanical Engineering Positions

1. Systems Engineer (current: Matt Wenner)
   - Aerodynamics, stability and system architecture

2. Structural Engineer (current: Josh Fields)
   - Aircraft structural support

3. Auxiliaries Engineer (current: R. M. Lattanzi)
   - Control surfaces, linkages, and landing gear

4. Transition Engineer (NEW POSITION)
   - Implementing ordnance-dropping device for Advanced Class
2015-2016 AERO TEAM

Perception verses Reality

**Perception**
- Last resort
- Simple methodology
- Low accountability
- ‘Team-project-itis’

**Reality**
- Time commitment
- Lose portion of winter/spring breaks
- Must travel
- Designs evolve constantly
- Weekly team meetings
2015-2016 AERO TEAM

Benefits

1. Immense learning curve
   • Serves as culmination of undergraduate curriculum

2. Invaluable skills acquired; resume booster
   • Team communication
   • Interdepartmental collaboration
   • Accountability
   • Technical skills
   • Ability to set and meet deadlines

3. Extremely challenging; even more rewarding
### 2015-2016 AERO TEAM

#### Aero Could Land You…

<table>
<thead>
<tr>
<th>Aero Alumni Employer</th>
<th>Correspondences</th>
</tr>
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<tbody>
<tr>
<td>UTC Aerospace Systems</td>
<td>N.A.S.A.</td>
</tr>
<tr>
<td>Honda R&amp;D</td>
<td>Northrup Grumman</td>
</tr>
<tr>
<td>General Dynamics</td>
<td>Boeing</td>
</tr>
<tr>
<td>General Electric</td>
<td>Porsche</td>
</tr>
<tr>
<td>Con Edison</td>
<td>United States Department of Defense</td>
</tr>
</tbody>
</table>

and more…
Union College SAE Mini Baja Team

Captain: Alexander Funez

Advisor: Prof. Tchako
What We Do

- Design and build a prototype off-road racer
- Race against other schools during a multiday competition
- Defend technical and economic aspects of design.
Future Projects

- Systems Engineer
- Suspension modeling and dynamic optimization
- Drivetrain optimization
- Telemetry and real time data logging
- Clutch redesign
- Composite body panels
Skill Development

- Interdepartmental Relationships
- Practical Manufacturing Experience
- Material Selection and Ordering
- Time Management
- Communications
Questions?