Mechanical and Aerospace Engineering
Freshman/Sophomore Advising Session

Prof. Yun Wang
Professor, Mechanical and Aerospace Engineering
Mechanical Engineering Undergraduate Advisor

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Aerospace Engineering Undergraduate Advisor

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Director, Undergraduate Student Affairs
Henry Samueli School of Engineering

http://engineering.uci.edu/dept/mae/undergraduate

PLEASE go to
https://tinyurl.com/MAEadvising
for sign in and quiz!!
all major courses must be taken for a letter grade. I found this in the catalogue:

The Pass/Not Pass option is available to encourage students to enroll in courses outside their major field. Pass/Not Pass option cannot be used to satisfy specific course requirements of the students school and major. Students must take courses to fulfill the UC Entry Level Writing requirement for a grade. For more complete information, see the Academic Regulations and Procedures section of this Catalogue.
Welcome to MAE!

- This advising session will:
  - describe our programs
  - identify various research and other opportunities
  - discuss career paths available to you
  - indicate additional advising resources
  - answer your questions about the AE and ME programs
  - more!!

*From a survey and study the relationship between the college experience and college graduates' lives

The odds of thriving in all areas of well-being are:

- **4.6x** Higher if ... Engaged at work
- **2.0x** Higher if ... Emotionally attached to school
- **2.5x** Higher if ... [College] prepared me well for life outside of college.
- **1.9x** Higher if ... [College] passionate about the long-term success of its students.
- **1.7x** Higher if ... I had a mentor who encouraged me to pursue my goals and dreams.
- **1.7x** Higher if ... My professor at [College] cared about me as a person.
- **1.5x** Higher if ... I had at least one professor at [College] who made me excited about learning.
- **1.9x** Higher if ... graduates experience all three
- **1.5x** Higher if ... I had an internship or job that allowed me to apply what I was learning in the classroom.
- **1.4x** Higher if ... I was extremely active in extracurricular activities and organizations while attending [College].
- **1.1x** Higher if ... I worked on a project that took a semester or more to complete.
- **1.3x** Higher if ... graduates experience all three

The odds of being engaged at work are:

- **2.6x** Higher if ... [College] prepared me well for life outside of college.
- **2.4x** Higher if ... [College] passionate about the long-term success of its students.
- **2.2x** Higher if ... I had a mentor who encouraged me to pursue my goals and dreams.
- **2.0x** Higher if ... I had at least one professor at [College] who made me excited about learning.
- **1.9x** Higher if ... My professor at [College] cared about me as a person.
- **2.3x** Higher if ... graduates experience all three
- **2.0x** Higher if ... I had an internship or job that allowed me to apply what I was learning in the classroom.
- **1.8x** Higher if ... I was extremely active in extracurricular activities and organizations while attending [College].
- **1.8x** Higher if ... I worked on a project that took a semester or more to complete.
- **2.4x** Higher if ... graduates experience all three

The UCI General Catalogue

http://catalogue.uci.edu

- The UCI General Catalogue contains the OFFICIAL requirements for the major
- You may follow requirements of any single catalog from your matriculation year forward
- There may be changes in course offerings that require modifications to the catalog requirements
- Information on course articulation from community colleges at: http://www.assist.org

PLEASE go to https://tinyurl.com/MAEadvising for sign in and quiz!!
How are the AE/ME programs set up?

• Essential foundation
  – Mathematics, Physics and Chemistry

• The CORE

• Specialization and Depth
  – Technical electives

• Engineering Design

• General Education

PLEASE go to https://tinyurl.com/MAEadvising for sign in and quiz!!
Majors

• Mechanical Engineering (188 units)**
  4 technical elective courses, restricted lower-division science courses, General Education courses, Senior design project (MAE189, 3 units minimum)

• Aerospace Engineering (185 units)**
  3 technical elective courses, restricted lower-division science courses, General Education courses, Aircraft design (MAE159)

• Double Majors
  – Mechanical and Aerospace
  – Mechanical or Aerospace and Materials Science (See their department undergraduate advisor)
  – others are possible, but less common

*Students with demonstrated competence in a foreign language are allowed to take 5 fewer units.

+Students who do not place in Physics 7C must add at least 4 units.

PLEASE go to https://tinyurl.com/MAEadvising for sign in and quiz!!
General Education Requirements

- Gen Ed requirements in Science & Technology, Quantitative Reasoning, and Laboratory will be met through major requirements.

- 10 additional Gen Ed courses (41 units) are required; suitable slots are identified in the sample program of study.

- One Gen Ed slot must be used for a foreign language course, unless you advance-place in a foreign language, in which case you may remove one course (5 units) from the above.

- You are required by the Major requirements to use one of those course slots for Economics 23.

  Take Economics 23 as early as possible (Spring So year). One special ENG-specific discussion is offered for MAE students: PLEASE ENROLL IN THE ENG-SPECIFIC DISCUSSION
General Education Requirements

• The remaining eight courses must be distributed as follows:
  – 3 in Writing
    • AP English Comp or Lang with a score of 4 or higher will satisfy WRT 39B;
  – 2 (plus Economics 23 or Econ 20A) in Social & Behavioral Sciences;
  – 3 in Arts & Humanities.

• ENGR 190 W (upper division writing course) is a required course.

• By appropriately choosing the courses to satisfy the requirements above, you can simultaneously satisfy the requirements for one course in Multicultural Studies and one course in International/Global Issues.

• The UCI Catalogue contains a sample plan of studies that meets all requirements.
AE and ME Prerequisite Flowchart

http://plaza.eng.uci.edu/degree-program/aerospace
http://plaza.eng.uci.edu/degree-program/mechanical
Freshman Year

• Math and Science
  Physics and math are pre-req.’s for nearly all required courses in MAE, hence falling behind in these subjects is a big problem!!! If you are off track in math or physics:
  • See a counselor
  • Use your summer to make up

• MAE10 – Programming (Any programing courses using Matlab, C, and Python. can be used to replace MAE10)

• ENGR 7A/7B – Introduction to Engineering (Experiential learning)
  – Not required, but will replace a tech. elective in upper division

PLEASE go to https://tinyurl.com/MAEadvising for sign in and quiz!!
## AE / ME Freshman Year (45/49 units)

<table>
<thead>
<tr>
<th>Fall (16 units)</th>
<th>Winter (16 units)</th>
<th>Spring (13 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 2A</td>
<td>Math 2B</td>
<td>Math 2D</td>
</tr>
<tr>
<td>MAE 10</td>
<td>Phys. 7C, 7LC**</td>
<td>Phys. 7D, 7LD</td>
</tr>
<tr>
<td>Chem. 1A</td>
<td>Chem. 1LE</td>
<td>Basic Sci. Elect.</td>
</tr>
<tr>
<td></td>
<td>(or Basic Sci. Elect.)</td>
<td></td>
</tr>
<tr>
<td><strong>(ENGR 7A)</strong></td>
<td><strong>(ENGR 7B)</strong></td>
<td></td>
</tr>
</tbody>
</table>

* ENGR 7A-7B is a technical elective, available only to first year students in Fall and Winter quarters. Both ENGR 7A & 7B must be taken to count as a technical elective. If ENGR 7A-7B is taken, this will replace one engineering elective course in the senior year.

** Remedial Course needed for Students who cannot place in Physics: Take Physics 2 and then Physics 7C, 7LC

*These are recommendations, not required.
# AE / ME Sophomore Year (46 / 50 units)

<table>
<thead>
<tr>
<th>Fall (18 units)</th>
<th>Winter (16 units)</th>
<th>Spring (12/16 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 3A</td>
<td>Math 3D</td>
<td>Math 2E</td>
</tr>
<tr>
<td>Phys. 7E, 52A</td>
<td>ENGR 54</td>
<td>MAE 91</td>
</tr>
<tr>
<td>MAE 30</td>
<td>MAE 80</td>
<td>MAE 52</td>
</tr>
<tr>
<td>Gen. Ed.</td>
<td>MAE 60</td>
<td>Econ 20A or 23 (or Gen. Ed.)</td>
</tr>
</tbody>
</table>

*These are recommendations, not required.*
Math and Science are essential!!

- You will use them in all of your engineering courses
- They are the foundation of engineering models and algorithms
- Engineering models are used for predicting system behavior and achieving design objectives without system overdesign. Example: Build SAE formula car as light as possible but still capable of withstanding dynamic loads during a race
The Cut

- Minimum Grade requirements to enter MAE130A
  - At least C- in Math 2D, Math 3D, Math 2E, Phys 7C, MAE 30, MAE 80...

- GPA requirements
  - A GPA of 2.0 or better is considered “good academic standing”
  - However, better jobs and graduate school require a far higher GPA (3.0 or better)
Junior Year

- Heart of engineering fundamentals
- Widely considered the most challenging year (9 required engineering courses)
- ENGR 100—is a very valuable 1-unit elective course (particularly for research and projects) It is also very restricted (add-code only) with only a couple offerings per quarter. Alternative is to get machining experience at community colleges (OCC, for example).
- MAE 106 - Build a robotic device and compete!
### AE / ME Junior Year (45/49 units)

<table>
<thead>
<tr>
<th>Fall (13/17 units)</th>
<th>Winter (16 units)</th>
<th>Spring (16 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAE 150, 150L</td>
<td>MAE 146</td>
<td>MAE 106</td>
</tr>
<tr>
<td></td>
<td>MAE 147</td>
<td></td>
</tr>
<tr>
<td>MAE 130A</td>
<td>MAE 130B</td>
<td><strong>MAE108</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>MAE120</strong></td>
</tr>
<tr>
<td>MAE 115 or MAE 112 (W)</td>
<td>MAE 157</td>
<td>MAE 135</td>
</tr>
<tr>
<td></td>
<td>MAE 156 or 157</td>
<td>MAE 145</td>
</tr>
<tr>
<td></td>
<td>or 155</td>
<td></td>
</tr>
</tbody>
</table>

*These are recommendations, not required.*
Senior Year

• Engineering depth and design

• Technical electives (ME 16 units; AE 12 units)
  – Check MAE web pages for rules applying to technical electives and a list of pre-approved courses
  

  – ME majors: Check specialization requirements

• Double majors must fulfill all requirements for both majors.
# AE / ME Senior Year (49/45 units)

<table>
<thead>
<tr>
<th>Fall (12/16 units)</th>
<th>Winter (16 units)</th>
<th>Spring (17 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAE 112</td>
<td>MAE 175</td>
<td>MAE 159</td>
</tr>
<tr>
<td>MAE 107</td>
<td>MAE 151</td>
<td>MAE 189</td>
</tr>
<tr>
<td>MAE 136</td>
<td>MAE 158</td>
<td>Tech. Elec. 2</td>
</tr>
<tr>
<td>Tech. Elec. 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAE 170</td>
<td>Tech. Elec. 1*</td>
<td>Tech. Elec. 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tech, Elec. 3</td>
</tr>
</tbody>
</table>

* One technical elective can be omitted if the student took ENGR 7A/B in freshman year.

*These are recommendations, not required.*
Specializations in ME

Specializations consist of 2 technical elective courses taken in the specialty area along with completion of a senior project relevant to the specialization (see details in the catalogue)

• Aerospace Engineering
• Energy Systems and Environmental Engineering
• Flow Physics and Propulsion Systems
• Design of Mechanical Systems

You cannot use core requirements to satisfy a specialization
ME 189 Senior Design Projects

Web page:  
http://projects.eng.uci.edu/department/mae

- Students with senior standing can enroll in MAE 189
- There are ways for non-senior students to participate (ENGR 7A/7B, MAE93)
- Examine list of projects (also check the web page through the summer)
- Form a team, find an advisor, and start on projects right away
- Contact the faculty advisor for a particular project, or Prof. Mark Walter, for help
- Display Day is (usually) Friday of finals week
- Fabrication training and resources are available
RapidTech@UCI

RapidTech Equipment

- Z Corp 3D Printing (x3)
- 3D Systems Stereolithography (x3)
- 3D Systems Selective Laser Sintering (x2)
- Stratasys Fused Deposition Modeling (x2)
- Stratasys Multi-jet (x5)
- Objet Poly-Jet Modeling
- Concept laser MLAB R*
- EOS M290*
- EOS P395*
- Stratasys Fortus MC 400 (x2)*
- EOS Formiga P110*
- OMAX Waterjet
- HAAS CNC (Mill & Lathe)
- EnVisionTEC DLP
- Laser Scanning (x4)
- Thermo Vacuum Forming
- Fiberglass & Composite Tooling
- Metal Plating
- 3D Design Software

Contact us at: UCIFABWORKS@gmail.com
Phone: 949 824 5667

Train for FREE: Laser Cutter, 3d Printer, Desktop CNC,
Sewing Machines, 3d Scanners and more…

http://fabworks.eng.uci.edu
Sample Projects

• Formula SAE - Small scale racer
• SAE Aero Design West - Cargo plane
• AIAA Design-Build-Fly Project
• AIAA Human Powered Airplane
• UCI Satellite Project
• UCI Rocket Project
• UCI Hyperxite
More Sample Projects

• Streamlining IC Engine Components
• Wafer Fabrication Probe Station
• Finite Element Analysis of Human Bone
• ASME Human Powered Vehicle
• Profiling Meteorological Mast
• Flight Control
• Fuel Cell Power
• Wind turbine
SAE FORMULA CAR

https://zotfunder.give.uci.edu/project/11222
UCI ROCKET

https://www.youtube.com/watch?v=ePKLwGWOhXQ&t=106s
Additional/Alternative Design Opportunity

MAE 188 – Engineering Design in Industry

Work in a team of 4-5 students and one industry supervisor to tackle a project proposed by a local company. Identify challenges, review the state of the art in a field, perform design activities, demonstrate concepts, present deliverables and prepare reports.
Research Opportunities

• MAE 199 - Independent Study

Contact a faculty member to inquire about research opportunities in their group. If needed, funding can be provided by two mechanisms:

  – **UROP** (Undergraduate Research Opportunity Program) provides small grants to successful proposals (~$1K range) to cover M&S

  – **SURP** (Summer Undergraduate Research Program) provides a 10-week salary for full-time summer research.

http://www.urop.uci.edu/
Research Areas

- Fluid dynamics
- Robotics and biorobotics
- Controls
- Combustion
- Air pollution
- MEMS (microelectromechanical systems)
- Laser diagnostics
- Flight dynamics
- Aerospace Propulsion
- Aerospace Structures
- Mechanics of Materials
- Fuel Cells
- ...
The Mechanical and Aerospace Engineering (MAE) seminars are held according to the schedule shown below. Unless indicated otherwise in this schedule, the MAE seminars are held at 10:30-11:30 am on Fridays during the academic year via Zoom until further notice. The seminars (MAE298) are mandatory for first-year graduate students. For more information, please call 949-824-5406.

Winter Quarter 2021

**Friday, January 8**
Speaker: Amit Dhadwal  
Title: An Engineering Foundation to a Non-Engineering Career Path: Life lessons learnt as a former UCI student  
Location: [Zoom Link](#)  
Host: Roger Rangel

**Friday, January 15**
Speaker: Phillip Westmoreland  
Title: Combustion, a transdisciplinary intersection of molecular and thermomechanical physics  
Location: [Zoom Link](#)
Other Opportunities

- Student Chapters and Honor Societies
  - Pi Tau Sigma (ME Honor Society)
  - Sigma Gamma Tau (AE Honor Society)
  - Tau Beta Pi (ENG Honor Society)
  - ASME
  - SAE
  - AIAA

- Student government
  - ASUCI
  - Engineering Student Council
Study Abroad!
The world is your classroom...

UC Education Abroad Program Deadlines for summer and fall:

https://studyabroad.uci.edu/deadlines-apply/

• FACT: You CAN take courses abroad that fulfill your degree requirements!
• FACT: You CAN afford it! Financial aid and scholarships apply!
  • Engineering has small scholarships for students studying abroad

Visit UCI’s Study Abroad Center in Student Services II, Room 1100
(-across from the Zot-n-Go). www.studyabroad.uci.edu

Come see the EAP Mentors in REC 305
*DUT-UCI Mechanical Engineering Joint Program in China (Contact Kan: kanl3@uci.edu or Lily: lwu@uci.edu)
UCI Academic Honesty Code

UCI has a very serious Academic Honesty Code. **Violations are not tolerated** under any circumstances. Please carefully read: https://aisc.uci.edu/index

- Any student cited for Academic Misconduct will have the report kept on file for 5 years.
- During this time, a second incident report would likely trigger suspension or dismissal from UCI.
- A single incident on file usually also results in the student being ineligible for honors at graduation.
- Many graduate and professional programs request this information and it may affect admission.
Career Paths

• **Graduate School (MS/PhD)**
  – Consider accelerated BS/MS program ([link](#))
  – Engage in individual research ASAP (Sophomore or early Junior year)

• **Industry employment**
  – 4 Career fairs on campus each year
  – Design experiences give you an edge!
Education Pays

Unemployment rate in 2012 (%)

<table>
<thead>
<tr>
<th>Degree</th>
<th>Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral degree</td>
<td>2.5</td>
</tr>
<tr>
<td>Professional degree</td>
<td>2.1</td>
</tr>
<tr>
<td>Master's degree</td>
<td>3.5</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>4.5</td>
</tr>
<tr>
<td>Associate's degree</td>
<td>6.2</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>7.7</td>
</tr>
<tr>
<td>High school diploma</td>
<td>8.3</td>
</tr>
<tr>
<td>Less than a high school diploma</td>
<td>12.4</td>
</tr>
</tbody>
</table>

Median weekly earnings in 2012 ($)

<table>
<thead>
<tr>
<th>Degree</th>
<th>Median Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral degree</td>
<td>1,624</td>
</tr>
<tr>
<td>Professional degree</td>
<td>1,735</td>
</tr>
<tr>
<td>Master's degree</td>
<td>1,300</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>1,066</td>
</tr>
<tr>
<td>Associate's degree</td>
<td>785</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>727</td>
</tr>
<tr>
<td>High school diploma</td>
<td>652</td>
</tr>
<tr>
<td>Less than a high school diploma</td>
<td>471</td>
</tr>
</tbody>
</table>

All workers: 6.8%

Advising Resources

- UGSA (Undergraduate Student Affairs Office)
  http://undergraduate.eng.uci.edu/
- UAs (Undergraduate Advisors)
  - AE Program: Prof. Haithem Taha
  - ME Program: Prof: Yun Wang
- Catalogue http://catalogue.uci.edu
- UCI MAE website
  http://engineering.uci.edu/dept/mae/undergraduate
Thank You for Attending
Questions?

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

Discovery • Creation • Service

Our mission is to educate students to be world class engineers and leaders, in California and beyond, by engaging them in a stimulating community dedicated to the discovery of knowledge, the creation of new technologies, and service to society.

THE HENRY SAMUELI SCHOOL OF ENGINEERING
UNIVERSITY OF CALIFORNIA • IRVINE