University of Southern California
Viterbi School of Engineering
Department of Aerospace and Mechanical Engineering

AME 599: Design and Advanced Manufacturing of Machine Components

Practical Information

Class Number:	Session: 28777D
Number of Units:	4 units
Lecture Hour/Day:	Lecture: 11 a.m. - 1:50 p.m. Mondays
Instructor:	Dr. Bo Jin (OHE 430F) bochengj@usc.edu
Instructor's Office Hours:	TBD – see Black Board And by email or in person appointments
TA:	TBD – see Black Board
TA's Office Hours:	TBD – see Black Board
Required Materials:	Course notes will be made available online MATLAB software is required (license will be provided)
Prerequisites/Corequisites:	AME599: Computational Design of Machine Components AME308: Computer Aided Analyses for Aero-Mechanical Design

Course Objectives

This course will introduce you to modern design and advanced manufacturing techniques of machine components, along with some cutting-edge manufacturing and characterization methods for common machine components that are widely used in today's aerospace and automotive industries. Please email the professor to obtain the "D-Clearance" for course registration.

Course Schedule

Week	Topic	Deliverables (Due Before Lecture via BlackBoard)
1	Computer Aided Manufacturing (CAM) Introduction	
2	CAM - Subtractive and Additive Manufacturing I	
3	CAM - Subtractive and Additive Manufacturing II	
4	Design and Manufacturing for Non-Destructive Evaluation (NDE)	HW Report #1
5	Computer Aided Manufacturing and Design of Shafts, Tubing, Frames	
6	Computer Aided Manufacturing and Design of Ply Drop-Off	HW Report #2
7	CAM and Design – Fluids	
8	CAM and Design – Fluids, Vacuum Assisted Resin Transfer Molding	HW Report #3
9	**MIDTERM (During Class)**	**MIDTERM EXAM**
10	CAM and Design - Load Carrying Capacity: Structural Design I	
11	CAM and Design - Load Carrying Capacity: Structural Design II	Project Proposal
12	Computer Aided Manufacturing and Design of Load Carrying Structures	HW Report #4
13	Project Midterm Presentation	Project Mid-Term Report
14	Load Carrying Capacity: FEA vs. Structural Validation w/ Linear Variable Differential Transformer	HW Report #5
15	Load Carrying Capacity: FEA vs. Structural Validation w/ Digital Image Correlation	
16	Final Review & Group Project Presentations	
FINAL	**FINAL**	**FINAL EXAM**

Grading Policy

- 25% Homework
- 25% Project
- 10% Midterm Exam
- 10% Attendance
- 30% Final Exam

Important Dates

- See USC registration calendar for last day to drop class w/ and w/o a mark of "W".

Group Project: 30%

This course includes a group project for you to demonstrate the design, manufacturing, and characterization skills that you have learned in this course. The purpose of this group project is for you to solve practical design problems in the field of aerospace and mechanical engineering. You are encouraged to identify new applications, but sample topics will be provided to students with less experience in advanced design and manufacturing. Working as a group is permitted if the project is large enough to justify this.

Project Timeline:
- Week 10: Identifying team members and discuss potential project topics
- Week 11: Project information due (with team member names, project topic)
- Week 12: One-page project proposal due (milestone plan with Gantt chart)
- Week 13: Presentation on project mid-term report & mid-term report due (problem description, preliminary model and results)
- Week 15: Project presentation session (open to all students) & final project report + PPT (model description, major discovery, results discussion) due

Sample project: "Design and Advanced Manufacturing on an Automotive Body/Chassis/Aerospace Stiffened Wing Section". The goal of the project is to develop a detailed engineering model and fabricate the part for a selected automotive or aerospace structure. Students can easily find resources and materials data available online. A project of this size usually consists of 2-4 people. The team will work together on collecting the experimental and measuring data, examining the preliminary results, identifying one challenge in the current topic, and providing a reasonable solution.

Grading breakdown of the Group Project:
- Proposal: 5%
- Mid-term report: 10%
- Final report and presentation: 10%

Statement on Academic Conduct and Support Systems

Academic Conduct:
Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:
Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298
equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.