



**USC Viterbi School of Engineering**  
Department of Aerospace & Mechanical Engineering

**Course name:** Computer-Aided-Design for Aero-Mechanical Design  
**Units:** 3 (Sections 28735 & 28935)  
**Schedule:** Spring 2025  
Lab: 2:00 -4:50 pm Wednesday (SAL)  
Discussion: 12:00 – 12:50 pm Thursday (KAP)  
**Location:** SAL 127 & KAP 148  
**Instructor:** Dr. Emma K. Singer  
**Office Location:** OHE 500E  
**Office Hours:** Mondays 10:30 – 11:30 am  
Fridays 1:00-2:00 pm  
**Contact Information:** [eksinger@usc.edu](mailto:eksinger@usc.edu)  
Include the string “AME 308” in email subject line

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**IT Help:** USC Viterbi IT  
**Hours of service:** M-F: 8:00 am – 10:00 pm  
**Contact Information:** [engrhelp@usc.edu](mailto:engrhelp@usc.edu)  
(213)740-0517  
<http://viterbiit.usc.edu/get-help>

## **Course Description**

This course will introduce you to some of the CAD tools widely used in industry today. The tools will include a solid modeling package NX and a finite element package. We'll see how these tools enable you to perform in hours a variety of analysis tasks that would otherwise take weeks.

**Course Prerequisites:** AME 204

**Course Co-Requisites:** AME 301

**Recommended Preparation:** AME 101 or AME 105

## **Learning Objectives**

1. How to create properly constrained sketches using sketch tools, dimensions, and geometrical relationships.
2. How to create part features from sketches.
3. How to create surface features from sketches.
4. How to create technical drawings with the appropriate symbols.
5. How to create assemblies from parts and assembly relationships.
6. How to simulate the response of a structure to applied loads.
7. How to apply motion to assemblies.

## **Software Required**

Siemens NX Software will be distributed by the instructor at the start of the term for installation on your own hardware. Note that this is a hardware-intensive software in terms of capabilities and memory storage, and requires a Windows operating system. Software is also available in classroom and via Viterbi Virtual Desktop.

## **Supplementary Materials**

Course notes will be available for download from the course's Brightspace page.

Recommended reading: *Sham Tickoo; NX 2023 for Designers, 15<sup>th</sup> Edition; CAD/CIM Technologies, Schererville, 2023*

## **Description and Assessment of Assignments**

Grades will be determined from a combination of homework scores, project scores, and exam scores. There will be weekly homework assignments (10 in all, see weekly breakdown). There will be one extended group (3-4 students) project assigned towards the latter part of the semester. The project will be comprehensive and require all topics introduced during the semester to be applied. All members of the group will receive the same grade. All assignments will be submitted electronically via Brightspace. Due dates will be posted with each assignment.

## Participation

Class participation scores are based on attendance and interactions during the lab and discussion periods. Electronic attendance is taken via Qwickly/Brightspace. The scores are awarded on the following scale:

Score	Explanation
0	Does not participate.
1	Present for at least 70% of lectures and discussions, not disruptive. Tries to respond when called on but may indicate that they are not following along or is actively conducting other work during lab
2	Demonstrates adequate preparation: offers straightforward information without elaboration or very infrequently (perhaps once a class.) Demonstrates sporadic involvement.
3	Demonstrates good preparation: Contributes well to discussion in an ongoing way, responds to other students' points, thinks through own points, questions others in a constructive way. Demonstrates consistent ongoing involvement.
4	Demonstrates excellent preparation: Contributes in a very significant way to ongoing discussion: keeps analysis focused, responds very thoughtfully to other students' comments, contributes to the cooperative argument-building, suggests alternative ways of approaching material and helps class analyze which approaches are appropriate, etc. Demonstrates ongoing very active involvement

## Grading Breakdown

Homework (10)	30%
Project	20%
Midterm	20%
Final	20%
Class Participation	10%
<b>Total</b>	<b>100%</b>

## Grading Scale

Course final grades will be determined using the following absolute scale:

A	85-100
A-	82-84
B+	78-81
B	74-77
B-	69-73
C+	64-68
C	59-63
C-	54-58
D	50-53
F	< 49

All student work must be original. Note that NX file history shows the author of every single operation in a history-based file. Any cheating will be reported to the Office of Academic Integrity and a grade of F will be recommended for the course.

### Assignment Submission Policy

The student is responsible for ensuring assignments are submitted by the listed due date and that all the documents needed to complete the assignment are contained in the zipped archive prior to transferring it to Brightspace. Credit will only be given for the documents actually submitted in the archive. If one document has another document as a prerequisite (e.g., an assembly file requires the component part files) and the prerequisite is missing/corrupted/etc., you won't be credited for either document. **No late homework assignments will be accepted.**

### Grading Timeline

Every effort will be made to return graded assignments within one week of submission.

Week	Date	Topic	Homework Due
1	15-Jan	Introduction, NX - Basics, Sketches (Ordered)	
2	22-Jan	NX - Features (Ordered)	HW #1
3	29-Jan	NX - Drafts, Technical Drawing and Nomenclature	HW #2
4	5-Feb	NX - Features (Synchronous), Structure Designer	HW #3
5	12-Feb	NX - Assemblies	HW #4
6	19-Feb	NX - Assemblies and Fasteners (Advanced)	HW #5
7	26-Feb	NX – Surfaces	-
8	5-Mar	NX - Geometric Dimensioning and Tolerancing (GD&T)	HW #6
9	12-Mar	<b>NX – Midterm</b>	HW #7
10	19-Mar	<b>Spring Break - No Lecture</b>	-
11	26-Mar	NX - Finite Element Analysis I	HW #8
12	2-Apr	NX - Finite Element Analysis II	-
13	9-Apr	NX - Kinematic Analysis	HW #9
14	16-Apr	NX - Kinematic Analysis, Human	-
15	23-Apr	NX - Project	HW #10
16	30-Apr	NX - Project	-

## Important Dates

**Midterm:** Week 9  
Wednesday Section: W March 12<sup>th</sup> 2025 from 2-4.50 p.m. in SAL 127.

**Final:** During Finals week  
Wednesday section: Monday May 12<sup>h</sup> 2025 from 2-5 p.m. in SAL 127.

**NX Group Project due:** Thursday May 8<sup>th</sup> 2025 by 2 p.m.

Last day to drop class without mark of “W”: Friday February 28<sup>th</sup> 2025.  
Last day to drop class with mark of “W”: Friday April 11<sup>th</sup> 2025.

## Recognized Student Organizations

Multi-student RSO events (i.e. conferences, competitions, etc.) which conflict with the posted course schedule must be discussed with instructors at the beginning of the semester. RSOs requesting accommodations need to have their RSO President send event dates and a participating student list to instructors prior to Week 3 of the semester to review scheduling and potential resolutions.

## Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university’s mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or “recycle” work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the [student handbook](#) or the [Office of Academic Integrity’s website](#), and university policies on [Research and Scholarship Misconduct](#).

## **Course Content Distribution and Synchronous Session Recordings Policies**

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

## **Course Evaluations**

Course evaluation occurs at the end of the semester university-wide.

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## **Students and Disability Accommodations**

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at [osas.usc.edu](https://osas.usc.edu). You may contact OSAS at (213) 740-0776 or via email at [osasfrontdesk@usc.edu](mailto:osasfrontdesk@usc.edu).

## **Support Systems**

*[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call*

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

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

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

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

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) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or [otfp@med.usc.edu](mailto:otfp@med.usc.edu)

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.