

UNIVERSITY OF SOUTHERN CALIFORNIA  
AME 408, Computer-Aided Design of Mechanical Systems  
Fall 2014

Time and Location: T 6:30 PM to 9:20 PM SAL 127 (Section 1, 28758)  
Th 6:30 PM to 9:20 PM SAL 127 (Section 2, 28759)

Instructor: Babak Boloury  
bboloury@hotmail.com

Office Hours: By appointment only  
SAL 127

Web site: <https://blackboard.usc.edu/>

TA: Mr. Keyvan Noury (noury@usc.edu)  
By appointment only

Textbook: There is no official textbook for the course. Handouts will be distributed on Blackboard as necessary. An official textbook may be announced later.

Reference and  
Supplemental  
books:

**SolidWorks:**

<b><u>Title</u></b>	<b><u>Author</u></b>	<b><u>ISBN</u></b>
1. Beginner's Guide to SolidWorks 2012 - Level I	Reyes	978-1-58503-698-1
2. Beginner's Guide to SolidWorks 2012 Level II	Reyes	978-1-58503-701-8
3. SolidWorks 2012 Part 1 – Basic Tools	Tran	978-1-58503-696-7
4. SolidWorks 2012 Part 2 – Advanced Techniques	Tran	978-1-58503-700-1
5. Parametric Modeling with SolidWorks 2012*	Schilling & Shih	978-1-58503-699-8
6. SolidWorks 2012 Tutorial*	Planchard	978-1-58503-702-5
7. Engineering Design with SolidWorks 2012*	Planchard	978-1-58503-697-4
8. Assembly Modeling with SolidWorks 2012*	Planchard	978-1-58503-708-7

**SolidWorks Simulation:**

<b><u>Title</u></b>	<b><u>Author</u></b>	<b><u>ISBN</u></b>
1. Engineering Analysis with SolidWorks Simulation 2012	Kurowski	978-1-58503-710-0
2. Introduction to FEA Using SolidWorks Simulation 2012	Shih	978-1-58503-704-9

All reference books are from SDC Publications ([www.schroff.com](http://www.schroff.com))

Goals: To develop student's understanding of the design of mechanical systems using advanced graphics techniques; design optimization, solids modeling and FEA methods. The course will develop the ability to effectively utilize commercial CAE software as a tool for better productivity in design. This semester SolidWorks and SolidWorks Simulation (CosmosWorks) packages will be used.

Prerequisites: AME 308, Statics, Strength of Materials, Stress Analysis, Heat Transfer, Dynamics and Vibrations, Matrix Algebra, Senior Standing

Grading:

Final Project:	22%
Exams #1	0%
Exams #2	25%
Projects:	33%
Labs:	20%

Late lab reports and projects will not be accepted under any circumstances. Also, make-up exams will not be given under any circumstances.

Every week, labs will be assigned. However, not all problems will be graded. Only a handful of them will be graded randomly throughout the semester. You are required to turn in all lab problems. I will not announce in advance which problems will be graded. All labs are due Thursday of the following week.

Contesting of grading of all assignments and exams must be done within one week after the graded assignment or exam is returned. After 7 days, the work will not be re-graded.

The two exams are closed note and consist of modeling problems.

- Even though the grade of the first exam does not contribute to your class grade, you are required to take the exam. Also note that if you score less than 50% on the first exam, it will negatively impact your final grade in the class, even though this exam does not have any weight. For the first exam, you are required to draw parts and assemblies parametrically and correctly with all design intents being met. When the dimensions of the object changes, the object should adjust accordingly and build without any errors. The problems will ask for the physical properties of the object, such as weight, moment of inertia, centroid, etc. The questions do not carry any partial credit.
- The second exam is usually made up of finite element analysis questions. You will be asked to mesh the part or assembly correctly with a proper type of element. Then find the stress, displacement, temperature, frequency, etc. This exam usually has partial credit.
- Tentative Dates for the two exams:

Exam I:	Friday October 17, 2014 (8:00 AM – 10:00 AM)
Exam II:	Friday November 14, 2014 (8:00 AM – 10:00 AM)

The final project is a group project. You will be asked to design a part with certain restrictions, such as size, stress, displacement, etc.

### Other Issues:

Be respectful to your classmates and the instructor. Students are expected to be on time for class and to remain once class starts. Cell phones and pagers should be turned off during class. The class hours are dedicated to AME 408 only. Therefore, during class and lab, you are not supposed to surf the web, play games on the web nor do homework for other classes. If you are caught doing so, you will be asked to leave the class.

Regular class attendance is obviously recommended.

### Course Outline:

1. Introduction
2. Introduction to CAD (Solid Modeling) and FEA
3. Part and assembly modeling using SolidWorks
4. Basic concepts of engineering analysis
5. Linear Static Analysis
6. Adaptive Analysis and Mesh Control
7. Dynamic Analysis
8. Linear Buckling Analysis
9. Thermal Analysis
10. Design Optimization

### Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday.

Website and contact information for DSP:

[http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html),  
(213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX),  
[ability@usc.edu](mailto:ability@usc.edu).

### Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. SCampus, the Student Guidebook, ([www.usc.edu/scampus](http://www.usc.edu/scampus) or <http://scampus.usc.edu>) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

### Emergency Preparedness/Course Continuity in a Crisis

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.