Computer-Aided Design for Bio-Mechanical Systems

ITP 308 (3 Units)

Spring 2017

Catalogue Description	Concepts of computer-aided design in 2-diemsions and 3-dimensions. Creating advanced parts using extrusions, surfaces, and equating driven sketches. Forming assemblies, and sub-assemblies, for motion analysis.
Objective	This course will introduce you to one of the CAD tools widely used in industry today. The tool will be SolidWorks. This tool will introduce the concepts of sketching, part assembly, drawings, assemblies, motion tools, and a finite element analysis tool. The course will implement the SolidProfessor teaching content designed to aid in the self-learning of concepts, eventually leading to the Certified SolidWorks Associate Develop certification
Prerequisites	None, but recommended preparation includes: MATH 245, and some strength of materials knowledge.
Instructors	Raymond Kim Email: raymonmk@usc.edu Office: OHE 530 G Office Hours: TBA Lecture: M 5:00 – 7:50 Location: KAP 267 Tyler W. Davis, Ph.D. Email: tyler.davis@usc.edu Office: OHE 530 A Office Hours: TBA Lecture: W 5:00 – 7:50 Location: KAP 267
Course Hours	2 hours and 50 minutes per week per section
Course Structure	The course will consist of: Weekly Homework Assignments Weekly In-class Lab Assignments Midterm Exam Final Project
Textbook(s)	All course material will be available through SolidProfessor. (www.solidprofessor.com)
Grading	The course is graded with the following weights: Homework 20% Labs 30% Midterm Exam 20% Final Project 30% TOTAL POSSIBLE 100%
Final Project	The final project will be a cumulative project that requires the use of learned material during the semester. The project will be worth 30% of the overall grade and will be an individual project. Requirements: A group of up to 3 students will create an assembly of their choice. The assembly must feature at least 4 different parts/students, with at least 8 different features (cuts, extrusions, surfaces, etc.) for each part. The assembly must be completely constrained with physical limitations accounted for (colliding parts, over-rotation, etc.).

Each group must submit a proposal that outlines their final project along with a list of parts that make up the assembly. Preliminary sketches or photographs must be provided as well as any supporting documentation for your build.

Each group will create a photo-realistic render of the assembly and create an animation of the assembly. Final projects will be presented during the assigned final time, including a discussion of the design process along with any trade studies that were conducted.

Anonymous peer evaluations will be submitted as well as evaluations of your project made by the other groups. Each will be taken into consideration when calculating the final project grade.

Total points: 100

20 Points – Proposal
20 Points – Presentation
50 Points – Assembly and Part Files
10 points – Evaluations

Grading Scale	Letter grades will be assigned according to the following scale:
	93%+ A
	90-92% A-
	87-89% B+
	83-86% B
	80-82% B-
	77-79% C+
	73-76% C
	70-72% C-
	69 D+
	67-68 D
	66 D-
	65 and below F

Homework   Homework and lab assignments will be given weekly. Students will submit all of their homework assignments and labs through Blackboard only. No email submissions will be counted towards a student's grade.

Late work will be accepted up to two days after the due date of the assignment or lab.

0 – 24 hours Late: 80% maximum credit
24 – 48 hours Late: 65% maximum credit
>48 hours late: 0% maximum credit

Policies   *Make-up policy for exams:* To make up for a missed exam, the student must provide a satisfactory reason (as determined by the instructor) along with proper documentation. Make-up exams are generally only offered in emergency situations.

Before logging off a computer, students must ensure that they have saved any work to either a USB drive or a service such as Dropbox. Any work saved to the computer will be erased after restarting the computer. ITP is not responsible for any work lost.

ITP offers Open Lab use for all students enrolled in ITP classes. These open labs are held beginning the second week of classes through the last week of classes. Hours are listed at: http://itp.usc.edu/labs/.

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 Section
11, *Behavior Violating University Standards* https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct/.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* http://equity.usc.edu/ or to the *Department of Public Safety* http://dps.usc.edu/contact/report/. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* http://www.usc.edu/student- affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage sarc.usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information http://emergency.usc.edu/* will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

An Additional Note on Plagiarism	In this class, all homework submissions will be compared with current, previous, and future students' submissions. If your work is found to be a copy of another person's work, or if you submit someone else's work as your own, the instructors will not hesitate to file a report with SJACS with a recommended penalty of an F in the course.
	Do not give other student's your SolidWorks files. This is the easiest way to avoid plagiarism. In the case that files have been shared, all students involved will receive the same penalty and no distinction will be made between those who submitted another person's work, and those who shared the file.

Course Outline*		
Week Lecture Date	Topic(s)	Reading/Homework
1 1/11	SolidWorks Interface; Sketches; Parts	*SolidWorks 101: Lesson 1,2,3* Assignment 1: Sketching Basics Lab 1: Shears Sketches
2 1/18	Extrusions; Boss/Bass; Sweeps; Patterns; Ribs/Shells; Chamfer; Planes	*SolidWorks 101: Lesson 4* Assignment 2: Basic Part Creation Lab 2: Simple Parts **Assignment 1 Due**
3 1/25	Assemblies; Assembly Features	*SolidWorks 101: Lesson 5* *Core Concepts: Assemblies* Assignment 3: Advanced Parts Lab 3: Basic Assembly **Assignment 2 Due**
4 2/1	Drawings; Section Views; Annotations; BOM	*Drawings* Assignment 4: Assemblies Part 2 Lab 4: Advanced Assemblies **Assignment 3 Due**
5 2/8	3D Sketching; Derived Sketches; Auto Trace	*Advanced Parts: Advanced Sketching* Assignment 5: Assembly Drawings Lab 5: 3D Sketches in Parts **Assignment 4 Due**
6 2/15	Lofts; Boundary; Dome; Wrap; Sweeps	*Advanced Parts: Sweeps, Lofts, Dome and Wrap, Boundary* Assignment 6: Advanced Part Creation II Lab 6: Bowling Pin **Assignment 5 Due**
7 2/22	CSWA: Parts	*SolidWorks 101: Lesson 7* Assignment 7: Advanced Part Creation III Lab 7: Sample CSWA Part Questions

		Assignment 6 Due
8 3/1	CSWA: Assemblies	*SolidWorks 101: Lesson 8, 9, 10* Lab 8: Sample CSWA **Assignment 7 Due**
9 3/8	**Midterm: CSWA**	
SPRING BREAK(3/12 - 3/19)	
10 3/22	Strength of Materials; Simulation of Loads; Factor of Safety	*SolidWorks 101: SimulationXpress* Assignment 8: Strength of Materials Lab 9: Generating Reports
11 3/29	Surfaces	*Surfacing Essentials* Assignment 9: Helmet Lab 10: Simple Surface Parts **Assignment 8 Due**
12 4/5	Assembly Features; Component Patterns; Advanced Mates	*Advanced Assemblies: Assembly Features, Component Patterns, Advanced Mate Types* Assignment 10: V12 Engine **Assignment 9 Due**
13 4/12	Scenes; Lights; Cameras	*Visualization and Appearances* Work on Final Project **Assignment 10 Due**
14 4/19	Motion and Animation	*Workshop: Motion and Animation* Work on Final Project
15 4/26	Decals; Material Properties	*Material Properties* *Adding Decals* *Giving a concise, useful technical talk* Work on Final Project
16 5/3	**Final Project Presentations TBA**	Presentation of Final Projects (15 min. max)

*The course outline is for planning purposes and is subject to change.