ENS410- (21541)
Advanced Solid Modeling Techniques
Spring 2022 – 2023 (202202)

Lecture Time and Location (ENS410-21541): **TUE** 10:40-12:30 (**ONLINE –** FASS G022)
  WED 11:40-12:30 (**ONLINE –** FENS G035)

Lecture ZOOM Link: https://sabanciuniv.zoom.us/j/4911122195

Recitation Hour Time and Location (ENS410R-21542): **WED** 12:40-13:30 (**ONLINE –** FENS L055)

Instructor:
Utku Seven, Ph.D.

Office: FENS L017
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Office hours: WED 13:40-15:30
Tel: 9595

Teaching Assistant/Office Hours:

Mahzad Sarghassabi (mahzads@sabanciuniv.edu) Office Hour (**WED** 13:40-15:30)
ZOOM Link: https://sabanciuniv.zoom.us/j/7476366331

Grading Assistant/Office Hours:

Muhammed Hasan Arıkan (harikan@sabanciuniv.edu) Office Hour (**TUE** 17:40-19:30)
ZOOM Link: https://sabanciuniv.zoom.us/j/7193185120

Course Book:

- Technical Drawing with Engineering Graphics, 15/E by Giesecke, Mitchell, Spencer, Hill, Dygdon, Novak, Lockhart & Goodman, Johnson, Prentice Hall, ISBN-10: 0-13-430641-4.
- Mastering Solidworks by Lombard, Wiley, ISBN: 978-1-119-30057-1

Purchase link: https://www.homerbooks.com/urun/

Supplementary References:

- Engineering Design Graphics with Solidworks 2015, 1/e by Bethune, Prentice Hall, ISBN-10: 0132740508

Catalog Description:

Advanced Solid Modeling Techniques is structured on the technical drafting and solid modeling knowledge provided in ENS209 (Introduction to Computer Aided Drafting and Solid Modeling). Advanced modeling techniques, their effects on technical drawings and documentation, based on the manufacturing methods will be investigated and taught in this course. CAD and CAE techniques will be discussed, respectively. Advanced part modeling techniques, advanced assembly modeling techniques, animation and motion studies, design automation techniques, welded constructions, sheet metal modeling and

manufacturing operations, surface modeling techniques, mold design, routing/piping modeling, basic (static/thermal) finite element analyses, advanced file management methods, and file format integration are included in the course content.

Objective of the course:

•Understanding the computer aided design process,
• Implementing advanced part modeling and constraint-based assembly modeling techniques,
• Preparing detailed part and assembly drawings of a product,
• Performing design automation techniques with configurations and design tables,
• Using specialized solid modeling techniques to create welded constructions, sheel-metal parts, complex surface bodies and piping/routing projects,
• Investigating Finite Element Method based Static and Thermal analyses, creating solid mesh for analysis, describing meshing parameters and mesh control techniques,
• Managing designs with large assemblies with sub-assembly structures, considering Design for Assembly and Manufacturing (Design for X) concept,
• Working with a CAD software (Solidworks) to design a complex assembly using advanced modeling techniques and generating required documentation (technical drawings, rendered images, animations, simulation reports, custom Bill of Materials tables, etc…),

Policies and Procedures:
- **Homepage:** https://sucourse.sabanciuniv.edu/plus We will be using **SUCourse+** which is a MOODLE based course management system. The outline of lecture notes, assignments, projects and other course material will be posted on **SUCourse+**.

- **Lecture Hours:** Lecture Hours will be held **ONLINE**. Participation policies will be announced during the first lecture hour.

- **Recitation Hours:** Recitation Hours will be held **ONLINE** via ZOOM Meetings.

- **Midterm Exams:** There will be **IN-CLASS** midterm exams (progressive) during the semester. The midterm exam will be on **May 2nd** from **10:40** to **12:30 (during lecture hours)**. **The questions in the exams will not be same as the solved example questions.**

- **Final Exam:** Final Exam will be held as an **IN-CLASS** exam. It will be provided during the final exam week. Final exam date will be assigned and announced by the faculty.

- **Assignments:** Homework assignments will be assigned regularly.

- **There will not be any extra-credit or assignments other than assigned.**

- **Missed Exams:** No excuses for missed exams will be accepted other than certified medical excuses from the campus health center or permission papers approved by the university's president. **A single comprehensive make-up exam** will be offered after or before the **final exam**.

- **Projects:** There will be a semester-project and **groups of four** will be formed to work on the projects. The details of the project will be provided in coming weeks.

- **Individual effort:** Any academic dishonesty (i.e. cheating, plagiarism...) shall be resolved according to the University's Academic Integrity Policy**. Any academic dishonesty such as cheating, plagiarism or unauthorized sharing will result in an "F" Grade in the course and/or disciplinary actions.**

- **Team effort:** Teams will periodically be asked to submit individual effort assessment. Teams having problem working together should make every effort to resolve them by themselves. If that doesn't work, contact the instructor for help.

- **Objections to grading:** If there is any objection to grading, the student must inform the instructor via an e-mail after grades are released. The students must clearly explain why he/she deserves the missed credit(s).

- **Attendance:** Formal roll will be held on an occasional basis during the Lectures. A minimum percentage of 50% attendance is obligatory for the lecture hours. Attendance will be taken according to your daily SUCourse submissions.

- **Computer usage:** You are expected and supposed to do CAD assignments, quizzes, project etc. on your own computer unless any prior approval of the instructor is given. Otherwise, you will get "0" from CAD assignments. **Your laptops will be registered during the lecture hours.**

- **Course grade:** A weighted-average grade will be calculated, and letter grades will be assigned to the overall grades.

- **Time conflict override: If you are registered to the course by time conflict override, you are the one who is responsible of any inconvenience regarding attendance, any missed lecture content, quiz etc.**

- **We may have to revise the course plan according to the reassessment to be made country-wide, regarding higher education, at the beginning of April. The content to be delivered is certain but the method of course delivery, the number and dates of exams, and some other details are subject to change.**

Grade Distribution for the course is revised as follows:

Assignments and Quizzes	10%
Midterm Exam (IN-CLASS)	30% x 1
Term Project	20%
Final Exam (IN-CLASS)	40%

Total	100%

Tentative Schedule

Week	Topic	Week	Topic
1	Introduction, Product Design Process	8	Welded constructions and welding representations
2	Advanced Part Modeling (Advanced sketching and boss feature techniques)	9	Sheet metal and bending operations with technical drawing representations
3	Advanced Assembly Modeling (Advanced Constraints, Exploded Views, BOM, in-assembly editing)	10	Creating and manipulating complex surfaces, forming solids with shell bodies
4	Detail drawings and assembly drawings	11	Routing/tubing/piping projects, used fittings and technical drawing representations
5	Animation tools, cameras, rendering images	12	FEM based Static and Thermal analyses, creating a solid mesh and mesh control techniques
6	Basic motion study and physical simulation constructions, analyzing graphical results	13	Using CAD libraries in Top-Down and Middle-Out designs, neutral file types
7	Design automation techniques	14	Integrating standard parts, managing large assemblies, assembly hierarchy