ChE 433 – Design of Chemical Processing Units
Fall 2017-2018

http://www.che.boun.edu.tr/courses/che433/che433.html

Course information:

Instructor: Dr. Ahmet K. Avcı, Professor of Chemical Engineering
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Teaching assistants:
- Selin Baç. Office: KB404, Office hours: T6W5, e-mail: selin.bac@gmail.com
- Elif Esvap. Office: KB 407, Office hours: W6Th2, e-mail: elifesvap@gmail.com
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Textbook:
- Sinnott, R.K., Towler, G., *Chemical Engineering Design*, 5th ed., Butterworth-Heinemann, 2009.

Supplementary reading & useful materials (*Later editions of the texts below can be used*).
- Peters, M.S., Timmerhaus, K.D., West, R.E., *Plant Design and Economics for Chemical Engineers*, 5th Ed., McGraw-Hill, 2003.
- Turton, R., Bailie, R.C., Whiting, W.B., Shaeiwitz, J.A., *Analysis, Synthesis and Design of Chemical Processes*, 4th Ed., Prentice Hall, 2013.
- Kirk-Othmer Encyclopedia of Chemical Technology – Electronic version available online at Bogazici University Library Website (http://www.library.boun.edu.tr/veritabanlari.php?scope=reference)
- Green, D.W., Perry, R.H., *Perry's Chemical Engineers' Handbook*, 8th Ed., McGraw-Hill, 2008.
- Fogler, H.S., *Elements of Chemical Reaction Engineering*, 4th Ed., Pearson Education, 2005.
- Geankoplis, C.J., *Transport Processes and Unit Operations*, 4th Ed., Pearson Education, 2003.
- Wilkes, O.J., *Fluid Mechanics for Chemical Engineers*, 2nd Ed., Pearson Education, 2006.
- Incropera, F.P., DeWitt, D.P., *Fundamentals of Heat and Mass Transfer*, 6th Ed., Wiley, 2006.

Lecture hours: TT 7 8 at KB 433, ThTh 3 4 at KB 433 (2h + 2h: 4h per week)
Number of credits: 3
Prerequisite courses: ChE 321, ChE 333, ChE 334, ChE 342
Course content: Engineering Design 100%
Computer use: 100% (ChemCad™ Process Simulator, other auxiliary software)

Course objectives:
- Integrate the elements of engineering design concepts with the fundamentals of unit operations of chemical engineering.
- Propose and build-up chemical processes complying with the most recent health, safety and environmental regulations.
- Select, design and specify individual units of chemical processes to meet the objectives of interest.

Prerequisites by topic:
- Chemical reaction kinetics and reactor design (ChE 342)
- Fundamentals of fluid flow, heat and mass transfer operations (ChE 232, ChE 333, ChE 334)
- Mass and energy balances on process flow sheets (ChE 211)
- Chemical engineering thermodynamics (ChE 321)

Course contents:
- Fundamental design methodologies, types and characteristics of chemical reactors.
- Fundamentals of industrial catalysts.
- Health, safety and environmental regulations in chemical process industries.
- Types and design features of transportation equipments used in chemical processes.
- Design of piping systems.
- Types and selection of materials of construction for process equipments.
- Design of stagewise equilibrium separation equipments.
- Design of heat transfer equipments.
- Design of storage equipments.
- ChemCad™ Demo (to be conducted by the course TAs).

Evaluation & grading policy:

Midterm Exam	**15%**	**Nov. 14, 2017 (Tuesday)**. Room: KB 432 /Open book (on limited basis), closed notes
Quiz 1	**5%**	**Nov. 2, 2017 (Thursday)**. Room: KB 432 / Closed book & notes
Quiz 2	**8%**	**Dec. 7, 2017 (Thursday).** Room: KB 432 / Closed book & notes
Final Exam	**25%**	**Date & room TBA** / Open book (on limited basis), closed notes
Project	**47%**	Build-up and design a process whose details will be announced on latest by **Sep. 28, 2017.**
		Detailed literature survey, manual and computer-based calculations. Creative team (group) work to be demonstrated by progress reports and short presentations (see below). Groups will involve 5 students.
TOTAL	**100 %**	
Project Breakdown		
Progress report	**11%**	Submission date: **Nov. 7, 2017 (Tuesday), 12:00 sharp.**
Progress presentation	**6%**	**Nov. 17, 2017 (Friday)**. Max. 10 min/group for presentation.
Final report	**21%**	Submission date: **Dec. 20, 2017 (Wednesday), 12:00 sharp.**
Final presentation	**9%**	**Jan. 3, 2017 (Wednesday)**. Max. 12 min/group for presentation

Other information:

- Project submission is a definitive must for passing this course. No matter of the midterm and final exam grades, the student/group will get a direct F in case he/she/group does not submit the final project. No excuses will be accepted for a missing final project report.
- Attendance to Quizzes is a must. No make-up will be given for Quizzes.
- The use of original copy of the textbook is a must. Original copies can be (1) purchased from the bookstore, (2) borrowed from the library or from previous classes. Partial or complete photocopies of the textbook are strictly prohibited, such copies will not be allowed for use in open-book exams.
- Course notes will not be allowed for use in open-book exams. A maximum of four textbooks will be allowed as the open-book exam material.
- Licensed and latest versions of ChemCad^{TM} software will be available during the course. Using illegal copies of ChemCad^{TM} will lead to a direct F, no matter what the grades are.
- Presentations will be done by all of the group members. At the end of the presentations, each member will be asked several questions about the project study.
- Assistance about your projects will be given only during the office hours specified in this document. No assistance will be provided by e-mail, phone, etc. The purpose of such a regulation is to sharpen your time management skills and encourage the execution of your project in a well-organized style. This will be one of the most important contributions of this course to your future (industrial or academic) career.

- **Academic Honesty:**
  - *Students are bounded by academic honesty. Cheating is a violation of academic honesty. The result is failing.*
- **Attendance policy:**
  - A minimum of 50% attendance is required. If the attendance is less than 50%, the letter grade will be reduced by one level, for example from BA to BB, from CC to DC and from DD to F (no E!).
- **Eligibility for attending the final exam:** Final Exam will not be given to the students who fail meeting in any of the two criteria below:
  1. Attendance > 50%
  2. Midterm exam grade > 20/100
  3. Personal grade from the progress report > 25/100
  4. Personal grade from Presentation 1 > 25/100

  In case of missing the Final Exam, the letter grade will be assigned as F and no make-up exam will be given.
- **Reports:** Late submission policy (unless otherwise specified)
  - Target: Submission date before 12:00 sharp.
  - Same day, submission btw 12:01 – 13:59: 10 pts. OFF (out of 100)
  - Same day, submission btw 14:00 – 17:30: 15 pts. OFF (out of 100)
  - Same day Submission after 17:30 and following days: Reports will not be accepted.
- **Average grading periods:**
  - Exams: 2-3 weeks, Reports: 2-3 weeks, Presentations: 1 week
- **Other:**
  - Please be in the class on time! Do not disturb the class if you see the doors closed.
  - Do not play with laptops, smartphones, tablets, etc. during the lecture hours.
  - Cell phones MUST be switched off during the lectures and in the exams. Any opposing attempts will be penalized (lectures – will be asked to leave the class; exams – will be treated as an attempt to cheating).