

**Gazi University**  
**Faculty of Engineering**  
**Chemical Engineering Department**  
**2023-2024 Fall Semester**

## **CHE 481 CHEMICAL ENGINEERING LABORATORY II**

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**Laboratory Documents:** Laboratory course sheets are available at the address below.

<http://mf-km.gazi.edu.tr/posts/view/title/laboratuar-dersleri-30251>

**Course Content:** Laboratory applications of heat and mass transfer, chemical reaction engineering principles. Instrumental analysis and experiments with applied technology. Evaluation of experimental data and results. Presenting a report. Special evaluation.

**Textbook and Supplementary Materials:** Experiment sheets containing some basic aspects and all library and Web facilities. Textbooks about heat and mass transfer, chemical reaction engineering.

**Objectives of the Course:** Learning of physicochemical analysis, heat and mass transfer and kinetic concepts with experimental studies; group work, designing experiments, conducting experiments, getting results and interpreting and developing scientific report writing skills. Course

### **Outcomes:**

- 1) To learn the laboratory applications of the concepts taught in basic chemical engineering courses.
- 2) To gain the ability of using laboratory devices.
- 3) Evaluating the experimental findings, examining the results and presenting them in a report, gaining the skills to work in disciplinary groups.

### **Evaluation Criteria Determination of Course Grade**

- Written and / or oral exams are done by the instructor before and after the experiment. During the experiment, the student's interest is evaluated as a performance grade. The grade determined by taking these into consideration affects the course grade by 20%.

- For each experiment, each group must submit a single report written at the request of the experiment instructor. These reports are evaluated by the instructor and a correction is requested when necessary. The report grade has a 50% effect on the semester-end grade.

Calculation of the course grade is given below:

Grade = 0,20 (Exam before and after the experiment + Performance) + 0,50 Report Grade + 0,30 Final exam grade

## GENERAL RULES

For CHE481 Chemical Engineering Laboratory II course, the student must have successfully completed all experiments. Students are required to attend at least 80% of the laboratory experiments, complete all experiments and submit their reports on time. In case of late submission of reports, 5 points will be reduced from the report grade for each day. Students who cannot come to the laboratory are compensated for a maximum of two experiments provided that their valid excuse is documented to the coordinator faculty member.

Each student is expected to make the theoretical and practical preparation of the experiment within the week before the experiment and must meet with the responsible instructor for the experiment at least three days before the experiment. Otherwise, the performance grade will be reduced by 5 points. It is the student's responsibility to carry out the theoretical research, to examine the experimental system in the laboratory, to learn the method of the experiment, how to obtain data by determining the changing parameters.

The experiments specified in the table above will be carried out in accordance with the program. The names and programs of the obligatory experiments are given in the table above. The groups are responsible for only one of the experiments in the specified group.

At the beginning of the experiment, the student's preparation for the experiment will be evaluated with a quiz. In case of failure, the student will not be able to take part in the experiment. Students who fail three times will automatically fail from this laboratory with the grade (D). Students who fail at most twice the quizzes will have make-ups for their experiments in the last two weeks.

## REPORT FORMAT

**Cover Page:** The name and number of the experiment, the names of the students, their numbers and groups, the name of the responsible instructor, the date of the experiment and the date of the submission of the report should be indicated.

**Abstract:** The purpose of the experiment, the characteristics of the devices used, the experiment conditions and parameters, the important results obtained (numerical and non-numerical) should be given. The abstract should answer the following questions in a very concise way; What has been done? How was it made? What was found? Which results have been achieved? Theory: In preparation for the experiment, you are expected to read the theory of the experiment. In this part of your report, you are also expected to provide information that is directly related to the experiment and helps you with your calculations, rather than general information.

**Experimental Procedure:** The apparatus used (with a schematic drawing of the system) and the method should be described.

**Experimental Data:** The data obtained as a result of the experiments should be given as a table. Calculations: A sample calculation should be given in detail in this section. Each student in the group will carry out these calculations themselves. Only one of them will be given in this section. Calculations of the other students will be given in the Appendix with their names written on them.

**Results and Discussion:** The numerical findings obtained at the end of the calculations should be presented in tables and/or figures in this section. The findings are discussed and interpreted experimentally and theoretically. How the findings change with the experimental parameters, whether they are compatible with the theoretical expectations are indicated and examined. Experimental errors are mentioned. (In cases where the results are not compatible with the theory, it is not enough to say experimental errors as the only reason.)

**Conclusion:** The results obtained after the experiment are briefly mentioned more qualitatively. For example, how an experimental or dimensionless parameter affects the performance and findings of the system is indicated. It is necessary to avoid giving numerical results (Findings) in this section unless necessary.

**Recommendations:** It is stated how to operate the test apparatus better and more efficiently, what can be done to reduce the experimental errors, what other work can be done with the present apparatus.  
**Nomenclature:** What all symbols and variables used in the report mean and their units in the SI system are listed in alphabetical order.

**References:** References should be cited as given in the literature and as in the examples below.

***Book:***

Seborg D.E., Edgar T.F., Mellichamp D.A., Process Dynamics and Control, 2nd Edition, Wiley, NY, 50-55, 2004.

***Journal Publication:***

Correia, V.M., Stephenson, T., Judd, S.J., "Characterization of textile wastewaters A Review", Environmental Technology, 15:917-929, 1994.

***Congress paper:***

Sekhtira, A., Lee, Y.Y. and Genetti, W.E., "Heat Transfer in a Circulating Fluidized Bed", Proc. of the 25th National Heat Transfer Conf., Houston, Texas, 24-27 July, 1988.

***Chapter in An Edited Book:***

Gökçay, C.F., Sağ, Y., "EndüstriyelUygulamalar", EndüstriyelAtıksuAritımı, 1. Baskı, Kimya MühendisleriOdası, Ankara Şubesi, 310-317 (1992). Thesis: Kayacan, İ., "Alçak ve Yüksek Yoğunluklu Polietilen Atıkların Pirolyzi", Yüksek Lisans Tezi, Gazi Üniversitesi, Fen Bilimleri Enstitüsü, Ankara, Aralık 2002.