KIM101/101E GENERAL CHEMISTRY I COURSE REPORT (2017-2021)

PRE-PANDEMIC PERIOD (2017-2019)

General Chemistry I course is designed to emphasize problem solving skills and critical thinking to engineering students as they learn the principals of chemistry and help them to focus into the world of science and engineering.

General Chemistry I courses are given in Turkish and English languages:
KIM 101 Genel Kimya I, course language Turkish (3 credits)
KIM 101E General Chemistry I, course language English (3 credits)

Since 2003, the Chemistry Department has given these courses every Fall, Spring and Summer semesters with parallel sessions; students are free to register for any session of their required course regardless of their department and program. Students must attend the session for which they are registered. A minimum of **70% attendance is required**. Periodic attendance checks are taken in class. **A student who is absent for 5 lectures (over 14 lectures) gets VF** (fails without midterm or final exam)**.** Students are also required to have at least **30** out of **100** from the in-term assessments to have the final exam (otherwise get a VF grade).

All the students registered in the course, regardless of their course language, take the same midterm and final exam on the same day and at the same time. Grade distributions are done separately for Turkish and English sessions and all students are considered in the same grade distribution on the basis of their course language. Students take a *multiple-choice test exam* as midterm and final exam about their general knowledge in chemistry. Exam papers are standardized so that the grade entry may be done using an optic reader. This offers the advantage of speed and lessens errors. The grades are recorded and are posted on the website (www.kimyahavuz.itu.edu.tr) and students are able to check their optic exam-answer sheets from here, as well. Additionally, exam locations, announcements, syllabus, course catalogue forms, outcomes, histograms of the courses are given through the same website. Instructors can access information about their students and course statistics through the site https://otm.kimya.itu.edu.tr/o/.

The grading scheme is: **Midterm I 25%; Midterm II 25%, Final exam 50%.**

Each semester **an exam committee** is appointed to KIM 101 and KIM 101E courses from Department members who teach General Chemistry courses. The Committee assists with determining the exam content, writing new exam questions and editing exam questions to ensure that the exams are of the highest quality.

Each semester **a course coordinator** is also appointed to KIM 101 and KIM 101E courses. Course coordinator is responsible for planning and coordinating the delivery of the Course and for ensuring an appropriate assessment with the Head of the Department, who has the final responsibility. The coordinator is also responsible of organizing and grading the exam papers. At the beginning of each semester, a meeting for all KIM 101 and KIM 101E instructors is arranged by the course coordinator. Important points (related with the syllabus, the attendance to the courses, the use of legal website of the textbook, etc.) are considered and given to the attention of the instructors. Discussions on these points help General Chemistry Course Instructors for useful and reasonable ideas for the next semester.

Each year over 3000-3500 freshmen attend these courses.

For student queries, a 2-hour "office- hour" period is allocated by the course instructors. This is announced in the lectures and also is indicated on a weekly course schedule hung on instructor's office door.

In **Table 1** and **Table 2**, averages of the grades for KIM 101 and KIM 101E sections are given for the last 5 terms _before pandemia_ (2017-2019).

Table 1. Averages for KIM 101 sections (points are given over 100)

	Midterm I	Midterm II	Final exam	General Average
2017/2018 Fall*	61	--	49,8	54,28
2017/2018 Spring	59,1	42,5	39,55	45,18
2018/2019 Fall	63,2	52,55	46,65	52,26
2018/2019 Spring	55,6	48,4	42,85	47,43
2019/2020 Fall	63,2	53,1	50,00	54,08

* Grading scheme for this term was Midterm 40%, Final exam 60%

Table 2. Averages for KIM 101E sections (points are given over 100)

	Midterm I	Midterm II	Final exam	General Average
2017/2018 Fall*	52,29	--	43,6	47,08
2017/2018 Spring	59,9	41,65	41,15	45,96
2018/2019 Fall	59,8	49,55	43,7	49,19
2018/2019 Spring	57,25	47,25	44,35	48,3
2019/2020 Fall	56,5	46,35	43,75	47,59

* Grading scheme for this term was Midterm 40%, Final exam 60%

As could be noticed from the given Tables, there is a significant difference in grade averages between English and Turkish sessions, Turkish ones being higher. The students still have

difficulties in following the English courses and understanding the questions asked in the exams. This problem seems to be encountered almost in all courses especially in the first years and has to be solved university-wide.

KIM101/101E COURSES IN "PANDEMIC" PERIOD (2020-2021)

On 11 March 2020, COVID-19 outbreak was declared as a "pandemic" and all countries were called to take immediate actions to reduce the transmission of the disease to save lives. All over the world, this led to a sudden shift to "distance education".

Istanbul Technical University, being sensitive, to protect the health of the students, faculty members and administrative staff, decided to conduct education at undergraduate and graduate levels by the "distance learning" method in 2020-2021, under pandemic conditions.

ITU already had a large-scale, web-based electronic learning platform called "**Ninova**" (ninova.itu.edu.tr). It is an electronic learning and teaching resource making education very quick and easy, providing many facilities to instructors and students like messaging; publishing announcements, assignments, events or notes; accessing courseware content and resources at any time and place.

As soon, a new licensed platform, **"Zoom"** (https://zoom.us/) was also implemented in distance education by ITU. Zoom is a multi-platform meeting solution with a cloud platform for video and audio conferencing, collaboration, chats and webinars and can be used across computers (e.g., desktops, laptops), mobile devices and phones. Its features like chatting, screen sharing, annotating, whiteboard, polling, breakout rooms, raising the hand, and managing participants, help instructors in creating virtual classrooms. One can see every person in the session at once through gallery view and meetings can be recorded as well.

All the students and instructors were immediately supported by websites, videos, pdf files and e-mails explaining the steps and the use of **Ninova** and **Zoom** Platforms, thus a quick adaption to online education was actualized.

In a very short time, on 6 April 2020, distance education started through these two platforms (Ninova and Zoom) without problems and has been carried out successfully in 2020 and 2021 (and since then, today, still in a hybrid manner).

Lectures were conducted in a synchronous way, which the instructors and students are found in an electronic environment (such as video conferencing, namely Zoom platform) simultaneously and the course is handled interactively.
All the lectures were recorded and records were available for students on Ninova without time constraint during the term. Students were also provided by lecture notes, support materials and resources through uploaded documents on Ninova, in class files of the course they are registered.

New type of education, namely "distance education" surely brought along new issues to be discussed and determined especially for in-term assessments, midterm and final exams and grade evaluations. Efforts were made in order to have the least negative influence on the

success of the students and also to ensure the quality and the fairness in all manners and fields.

The Distance Education Procedures-Principles were updated by ITU Senate in the context of the "Distance Education Procedures and Principles" of The Council of Higher Education (YÖK) (https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Uzaktan_ogretim/yuksekogretim_kurumlarinda_uzaktan_ogretime_iliskin_usul_ve_esaslar.pdf).

In this frame, an attendance requirement was not applied in the courses and in-term assessments were increased by adding homeworks and the final exam was limited to 40%. Students should have at least 30 out of 100 from the in-term assessments to take the final exam (otherwise, VF).

As a summary, "Grading Scheme" was established as follows:

2019-2020 Spring (when pandemia just started)
- Midterm, 25% (face to face)
- Final Exam, 75% (online)

2020-2021 Fall / 2020-2021 Spring (All online)

- Midterm, 40%
- Final Exam, 40%
- 2 Homeworks, 20% (each contributing 10%)

Midterm and final exams were conducted online as "multiple-choice test exams" by the use of licensed "**WitWiser**" platform (https://witwiser.io) that offers online assessment design and remote proctoring solutions. In the frame of distance education procedures and principles announced by The Council of Higher Education (YÖK), on the basis of "transparency, auditability and exam security measures", to the extent of legislations, students were asked to open their cameras during the exam and exam durations were recorded and watched later on by research and teaching assistants.

Following terms, a new platform "**ITU Ayva**" (https://ayva.itu.edu.tr) was introduced by ITU Information Technology (IT) Department for online exams. It is a quick, safe and user friendly platform for students and instructors.

Students having power and internet outages or connection problems, or suffering from any health issues or Covid-19 disease were subjected to online make-up exams equivalent to the exams they missed.

All exam grades were recorded and were posted to the websites in use (www.kimya.itu.edu.tr or www.kimyahavuz.itu.edu.tr) in a very short time after the exams.

In **Table 3** and **Table 4**, averages of the grades for KIM 101 and KIM 101E sections are given for the last 3 terms *during pandemia* (2020-2021).

Table 3. Averages for KIM 101 sections in distance-learning terms (points are over 100)

	Midterm	Final Exam	General Average
2019/2020 Spring*	58.25	37.14	42,42
2020/2021 Fall**	60.84	45.61	42,58
2020/2021 Spring**	63.9	48.97	59,78

*Midterm exam was performed face-to-face and final exam was performed online via Witwiser.

** Midterm and final exams were performed via ITU-Ayva online exam platform.

Table 4. Averages for KIM 101E sections in distance-learning terms (points are over 100)

	Midterm	Final Exam	General Average
2019/2020 Spring*	61.8	38.57	44,38
2020/2021 Fall**	55.48	51.98	42,98
2020/2021 Spring**	66.48	52.92	62,8

*Midterm exam was performed face-to-face and final exam was performed online via Witwiser.

** Midterm and final exams were performed via ITU-Ayva online exam platform.

At the end of each semester a "**Course Satisfaction Survey**" is conducted on students by ITU Coordination Office of Quality (https://kalite.itu.edu.tr/en/) to evaluate the contentment for all courses so that the instructors can reorganize their courses in the light of the survey outcomes and the university can make the right decisions in the field of education. Survey results are analyzed and are sent to course instructors via e-mail. Participations in surveys are unfortunately low (~5 % of the students). Students should be encouraged more and the importance of these surveys should be explained better.

A "**Distance Learning Satisfaction Survey**" was also conducted on students in order to value distance-learning activities done in 2020-2021 academic years. An Evaluation Report was prepared with the results obtained through this survey and is available on the website (https://kalite.itu.edu.tr/en/).

KIM101/101E COURSES—2021/2022 FALL SEMESTER

Under pandemic circumstances, according to the decisions taken by The Council of Higher Education (YÖK) and ITU Senate, education is conducted face-to-face. Registered students are divided into subgroups (according to the lecture hall capacities and student numbers) and they follow the courses face-to-face alternately (following the mask, distance and hygiene rules). Simultaneously, the course is broadcasted online via Zoom platform. Courses are recorded and students can access their course records from Ninova regardless of their subgroups. They can watch the records (without any time and date constraint) during the term whenever and wherever they wish.

The midterm and final exams are multiple choice tests and are conducted face-to-face. Grades are posted to www.kimyahavuz.itu.edu.tr website as usual shortly after the exams.

Grading scheme is:

- Midterm Exam, 40%
- 2 Homeworks, total 20% (each 10%)
- Final Exam, 40%

- Students are required to have at least 30 out of 100 from the in-term assessments (midterm exam and homeworks) to take the final exam. (Otherwise, VF grade.)
- Course attendances are followed but are not taken in consideration for a VF grade due to often changing conditions of Covid cases and pandemic.

Make-up exams are applied for students who miss the exams due to Covid-19 or any other health issues. Make-up exams are equivalent to missed exams in terms of fairness.

So far, no serious problem has been encountered in the course functioning.

Table 5. Averages for KIM 101 sections (points are over 100)

	Midterm	Final exam	General Average
2021/2022 Fall	51,58	47	57,81

Table 6. Averages for KIM 101E sections (points are over 100)

	Midterm	Final exam	General Average
2021/2022 Fall	41,95	41,85	51,83

ABET Committee,
Chemistry Department   February 2022