Assessment of General Chemistry I (KIM101 and KIM101E) Courses
2019/2020 Spring Semester-*PANDEMIC PERIOD*

General Chemistry I (KIM 101 and KIM 101E) 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 two languages; Turkish and English:
KIM 101 Genel Kimya I, course language Turkish (3 credits)
KIM 101E General Chemistry I, course language English (3 credits)

Chemistry Department opens these courses every Fall and Spring semesters with parallel sessions.

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 (http://cwx.prenhall.com/petrucci) , etc.) are considered and are 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.
For student queries, the course instructors allocate a 2-hour "office- hour" period. This is announced in the lectures and is indicated on a weekly course schedule hung on instructor's office door.

All the students registered in the courses, 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 (as KIM101 and KIM101E) and all students are considered in the same grade distribution based on 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 there, as well. Additionally, syllabuses, needed documents, exam locations and announcements for 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/.

Before Pandemic Period-Attendance to the Courses and Grading of Exams

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)**.**

The grading scheme for the exams: **Midterm I 25 %, Midterm II 25 %, Final exam 50%.**

The Pandemic Period- "Distance Education" and Necessary Regulations in Course Functioning

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 (March)-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 etc.) 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 pandemic conditions.

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 courses were 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 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.
In this frame, an attendance requirement was not applied in the courses and "Grading Scheme" was established for the current conditions as follows:

- Midterm, **25%**   (was done face to face just before pandemic started)
- Final Exam, **75%** (online, through WitWiser platform)

Final exam was conducted *online* as "multiple-choice test exam" by the use of licensed "**WitWiser**" platform (https://witwiser.io) that offers online assessment design and remote proctoring solutions. All the students and instructors were informed in time for the use of WitWiser. 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 (to ensure the fairness).

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.

This semester, a total of **1697 students (KIM 101 – 632 students and KIM 101E – 1065 students)** from various departments took the course in **32 parallel sessions.**

In Table 1, the average grades for midterm and final exams of KIM 101 and KIM 101E courses are given and compared. (KIM 101 and KIM 101E ; 2019/2020 Spring Semester.)

Table 1. 2019/2020 Spring– Averages of KIM 101 and KIM 101E Courses (points are over 100)

	Midterm	**Final exam**	**General Average**
KIM 101	58.25	37.14	42.42
KIM 101E	61.80	38.57	44.38

Table 2 and Table 3, shows the averages of the grades for KIM 101 and KIM 101E courses for the previous semesters.

Table 2. Averages for **KIM 101** sessions (2014/15 Fall-2019/20 Spring)- (points are given over 100)

	Midterm		**Final exam**	**General Averages**
2014/2015 Fall*	55.8		48.6	51.48
2014/2015 Spring*	54.95		50.44	52.25
2015/2016 Fall*	60.00		42.76	49.66
2015/2016 Spring*	53.64		46.4	49.3
2016/2017 Fall*	44.76		39.84	41.81
2016/2017 Spring*	48.20		50.44	49.54
2017/2018 Fall*	61		49.8	54.28
	Midterm I	**Midterm II**		
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	48.40	42.85	47.43
2019/2020 Fall*	63.20	53.10	50.00	54.08
2019/2020 Spring*	**58.25**		**37.14**	**42.42**

*multiple choice exam

Table 3. Averages for **KIM 101E** sessions (2014/15 Fall-2019/20 Spring)- (points are given over 100)

	Midterm		**Final exam**	**General Averages**
2014/2015 Fall*	48.12		42	44.45
2014/2015 Spring*	55.4		49.24	51.7
2015/2016 Fall*	52.68		36.16	42.77
2015/2016 Spring*	53.28		44.6	48.07
2016/2017 Fall*	37.6		34.8	35.92
2016/2017 Spring*	48.56		47.16	47.72
2017/2018 Fall*	52.29		43.6	47.08
	Midterm I	**Midterm II**		
2017/2018 Spring*	59.9	41.65	41.15	45.96
2018/2019 Fall*	59.8	49.55	43.70	49.19
2018/2019 Spring*	57.25	47.25	44.35	48.30
2019/2020 Fall*	56.50	46.35	43.75	47,59
2019/2020 Spring*	**61.80**		**38.57**	**44.38**

*multiple choice exam

As can be noticed from the given Tables, compared to the previous semesters, a slight decrease was observed in the averages, which could be considered as normal taking in account the sudden changes in our lives and the difficulties in adapting new conditions of the pandemic.

Generally, a difference is observed in grade averages between English and Turkish sessions, Turkish ones being higher, as 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 English courses, especially for the first-year students, and has to be solved university-wide. This semester, averages of English Courses are slightly higher than Turkish ones, which might be due to the good language skills of the registered students.

The number of KIM 101 (Turkish session) students who passed the course (including DC and DD) were **440** over **632**, which is **69.62 %** of the total students. The number of failed students having FF grade (no VF (without midterm or final exam) grade was assigned to the students due to pandemic conditions) are **192** which is **30.4 %** of the total students.

The number of KIM 101E (English session) students who passed the course (including DC and DD) were **779** over **1065** which is **73.15 %** of the total students. Fail (FF) grades are **286** over **1065**, which is **26.85 %** of the total students.

Figure 1 and **Figure 2** shows the percentages of each grade for KIM101 and KIM101E for 2019-2020 Spring Semester.
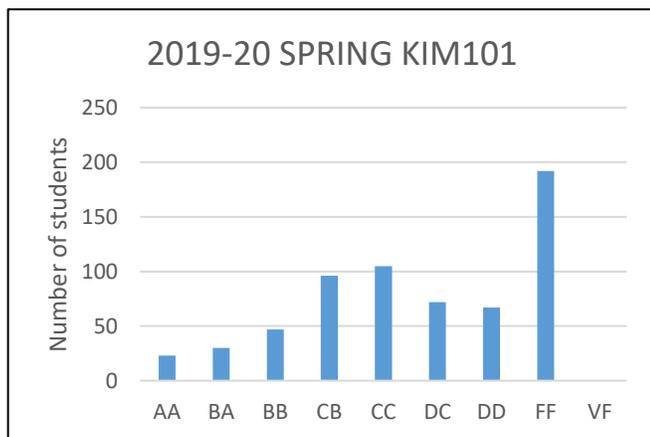

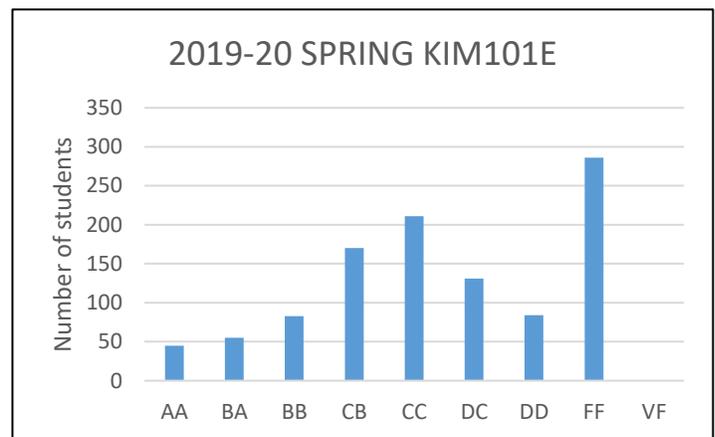**Fig.1** Percentage-grade graph for KIM101

Fig.2 Percentage-grade graph for KIM101E

Table 4 and Table 5 includes the grade distributions, the number of students and percentages for each grade for KIM 101 and KIM 101E sessions for 2019-2020 Spring Semester.

Table 4. Grade distributions, number of students and percentages for each grade for **KIM 101** sessions

Letter grade	Grade	Number of students	Percentage (%)
AA	Excellent	23	3.64
BA	Good-excellent	30	4.75
BB	Good	47	7.44
CB	Good-satisfactory	96	15.19
CC	satisfactory	105	16.61
DC	Satisfactory-low pass	72	11.39
DD	Low pass	67	10.60
FF	Fail	192	30.38
VF	Fail without midterm	0	0

Table 5. Grade distributions, number of students and percentages for each grade **KIM 101E** sessions

Letter grade	Grade	Number of students	Percentage (%)
AA	Excellent	45	4.23
BA	Good-excellent	55	5.16
BB	Good	83	7.79
CB	Good-satisfactory	170	15.96
CC	satisfactory	211	19.81
DC	Satisfactory-low pass	131	12.30
DD	Low pass	84	7.89
FF	Fail	286	26.85
VF	Fail without midterm	0	0

In the following **Table 6 and 7**, 2019/2020 Spring student numbers and averages related to each department for KIM 101 and KIM 101E sessions are given, respectively.

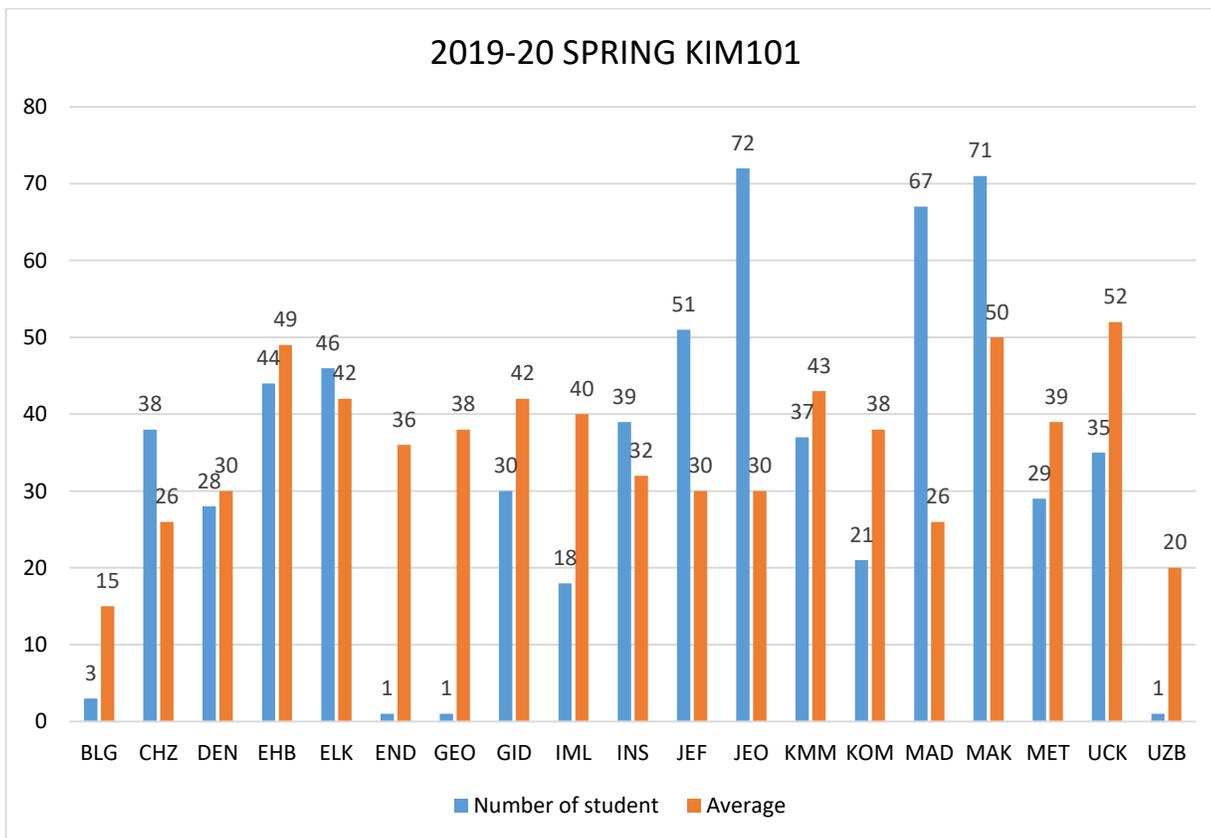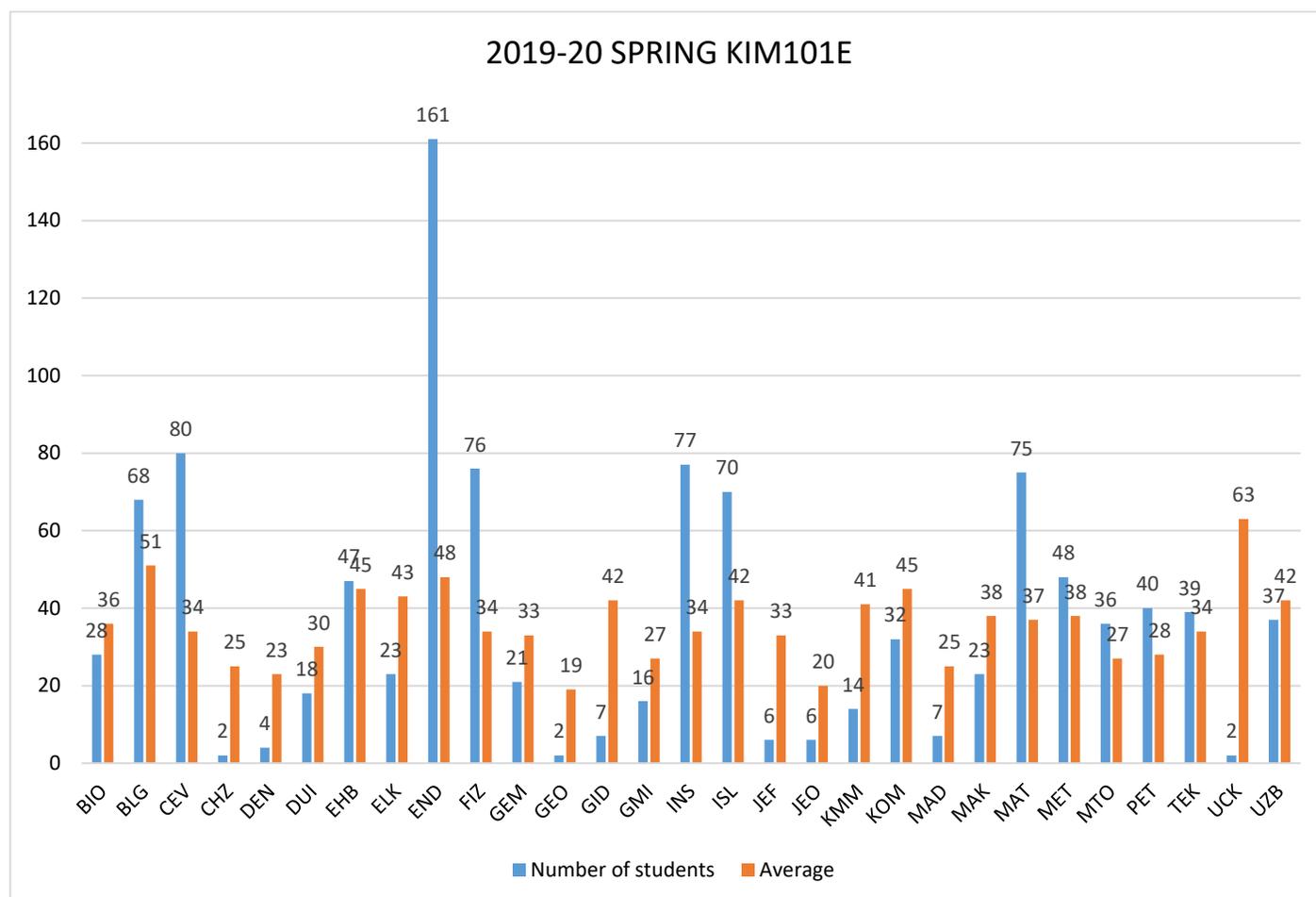**Table 6.** 2019/2020 Spring Averages by Departments for KIM 101 sessions

Table 7. 2019/2020 Spring Averages by Departments for KIM 101E sessions

2019-20 SPRING KIM101E

Undergraduate program codes can be reached from the website: https://www.sis.itu.edu.tr/EN/about-sis/undergraduate-program-codes.php

The highest averages are from UCK (Aeronautical Engineering), MAK (Mechanical Engineering) and EHB (Electronics and Communication Engineering) for KIM101 and are from UCK (Aeronautical Engineering) and BLG (Computer Engineering) for KIM101E.

There are also an access related with the course statistics (Outcomes, histograms, syllabus, etc.) through the website https://otm.kimya.itu.edu.tr/o/.

ITU, Faculty of Science, Department of Chemistry   **August 2020**

ABET Committee