



**KAZAKH-BRITISH  
TECHNICAL  
UNIVERSITY**

**JSC «Kazakh-British Technical University»  
School of IT and Engineering**

**APPROVED BY  
Dean of SITE  
Azamat Imanbayev**

«\_\_\_\_» \_\_\_\_\_ **2023**

## **SYLLABUS**

**Discipline:** Software Engineering

**Number of credits:** 3

**Course code - CSCI 2208**

**Term:** Fall 2023

**Instructors full name:**

<b>Personal Information about the Instructor</b>	<b>Time and place of classes</b>		<b>Contact information</b>	
	<b>Lessons</b>	<b>Office Hours</b>	<b>Tel.</b>	<b>e-mail</b>
ALDAMURATOV Jomart	Lecture & Practice - Room 461	Room 177 Wednesday – 14:00 – 14:50 Thursday – 14:00 – 14:50		z.aldamuratov@kbtu.kz

**COURSE DURATION:** 3 credits, 15 weeks, 45 class hours

### **GENERAL COURSE AIMS:**

This course aims to introduce the fundamentals of key Software Engineering concepts. The course will mainly cover a broad overview of Software Engineering and its purpose & importance

### **COURSE DESCRIPTION**

Besides a general knowledge of Software Engineering, this subject focuses on the enlargement of students' acquaintance with practices more deeply through class work and assignments.

### **COURSE OBJECTIVES**

The main goal of this course is to strengthen students' knowledge and practice in the following topics:

- Introduction to Software Engineering
- Software processes & Agile software development
- Requirements engineering & Systems modeling
- Architectural design & Design and implementation
- Software testing & Software evaluation
- Dependable systems
- Reliability engineering & Safety engineering
- Security engineering & Resilience engineering
- Software reuse & Component-based software engineering
- Distributed software engineering & Service-oriented software engineering
- Systems engineering & Systems of systems
- Real-time software engineering
- Project management & Project planning
- Quality management & Configuration management

## COURSE OUTCOMES

At the end of the course, students will be able to manage & understand real-life software engineering project

## COURSE REQUISITES

An overall understanding of data structures & software types is expected even though no software coding is planned in this class

## LITERATURE

Main - Lecture

Software Engineering, Global Edition, 10th edition, Ian Sommerville, 2016, Pearson;

<https://www.amazon.com/Software-Engineering-Global-Ian-Sommerville-ebook/dp/B01DWH1F2Y>

Main - Practice

UML Distilled: A Brief Guide to the Standard Object Modeling Language, 3rd Edition, Martin Fowler, 2004, Addison-Wesley Professional;

[https://www.amazon.com/UML-Distilled-Software-Engineering-Standard-dp-0582894441/dp/0582894441/ref=mt\\_hardcover?\\_encoding=UTF8&me=&qid=](https://www.amazon.com/UML-Distilled-Software-Engineering-Standard-dp-0582894441/dp/0582894441/ref=mt_hardcover?_encoding=UTF8&me=&qid=)

Additional

Several articles related to topics and online materials will be listed on the UNINET

## Course assessment criteria

Assessment occurs continuously throughout the course. The evaluation will be based on the levels of (maximums in %):

Type of activity	Final scores
Lecture Attendance / participation	15%
Practice Attendance / participation	15%
SIS / Assignments	22%
Midterm	8%
TSIS	0%
Final exam*	40%
Total	100%

\*Students who get more points than the required maximum for in-class, final testing are awarded bonus points in the amount exceeded.

## TASKS

for students independent study (SIS)

Week	SIS	Cost (in points)
2	<a href="#">Assignment 01</a>	2
4	<a href="#">Assignment 02</a>	3
6	<a href="#">Assignment 03</a>	3
8	<a href="#">Assignment 04</a>	3
10	<a href="#">Assignment 05</a>	3
12	<a href="#">Assignment 06</a>	4
14	<a href="#">Assignment 07</a>	4
	Total	22

## COURSE CALENDAR

Week	Classwork			SIS (students independent study)/Assignment	TSIS (teacher supervised independent study)
	Topic	Lecture	Practice		
1	Course Overview Course organisation Course Importance Professional software development Software engineering ethics	2	1		
2	Software process models Process activities Coping with change Process improvement  Agile methods Agile development techniques Agile project management Scaling agile methods	2	1	2	
3	Functional & Non-functional requirements Requirements engineering processes Requirements elicitation Requirements specification Requirements validation Requirements change	2	1		
4	Context models Interaction models Structural models Behavioural models Model-driven architecture	2	1	3	
5	Architectural design decisions Architectural views Architectural patterns Application architectures	2	1		
6	Object-oriented design using UML Design patterns	2	1	3	

	Implementation issues Open-source development				
7	Development testing Test-driven development Release testing User testing	2	1		
8	Evolution processes Legacy systems Software maintenance	2	1	3	
9	Dependability properties Socio-technical systems Redundancy and diversity Dependable processes Formal methods and dependability	2	1		
10	Availability and reliability Reliability requirements Fault-tolerant architectures Programming for reliability Reliability measurement  Safety-critical systems Safety requirements Safety engineering processes Safety cases	2	1	3	
11	Security and dependability Security and organizations Security requirements Secure systems design Security testing and assurance  Cybersecurity Socio-technical resilience Resilient systems design	2	1		
12	Software reuse Component-based software engineering Distributed software engineering	2	1	4	
13	Service-oriented software engineering Systems engineering	2	1		
14	Systems of systems	2	1	4	

	Real-time software engineering				
15	Project management Project planning Quality management Configuration management	2	1		
16	Final Exam				

### Course assessment schedule

Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	ES	MP
<b>Lectures</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		<b>15</b>
<b>Practices</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		<b>15</b>
<b>Project Assignments</b>		2		3		3		3		3		4		4			<b>22</b>
<b>Midterm</b>							8										
<b>Final Project</b>																<b>40</b>	<b>40</b>
<b>MP for EC</b>	2	4	2	5	2	5	10	5	2	5	2	6	2	6	2	<b>40</b>	
<b>TOTAL</b>																	<b>100</b>

MP-Max. Points for the semester; MP for EC-Max. Points for each class; ES-examination session;

**Class sessions** – will be a mixture of information, discussion and practical application of skills.

**Practice** – will reinforce the students knowledge by practical appliance of lectured materials.

**In-class assessment** – will prepare students for their mid-term and final assessment and identify the competence level they have achieved on a related subject matter, the aim being to diagnose potential discrepancies in students' understanding and performance in order to make specific adjustments to the course content and procedures and/or to assign additional assignments to certain individuals or the whole group.

**Home assignments** – will consolidate the concepts and materials taken during in-class activities, help students to expand the content through diverse background resources and/or practise certain skill areas; they will also develop the students' ability to work individually in exploring and examining related issues.

**SIS (Student Independent Study)** – comprises group Project to be done by students on the independent basis. Students are supposed to use knowledge and skills acquired in class to do the project. Assistance and advice will be provided by teachers during office hours.

**TSIS (Teacher Supervised Student Independent Study)** – student self-made project.

**End-term test** – a diagnostic test used to identify the students' progress, their strengths and weaknesses, intended to force student to prepare for Final Exam. It includes computer based test.

**Final examination** – 1) an attainment test designed to identify how successful the students have been achieving objectives.

**Grading policy:**

Intermediate attestations (on 7<sup>th</sup> and 15<sup>th</sup> week) join topics of all lectures, practice, laboratories, SIS, TSIS and materials for reading discussed to the time of attestation. Maximum number of points within attendance, activity, SIS, TSIS and laboratories for each attestation is 30 points.

Final exam joins and generalizes all course materials, is conducted in the complex form with quiz and problem. Final exam duration is 100 min. Maximum number of points is 40. At the end of the semester you receive overall total grade (summarized index of your work during semester) according to conventional KBTU grade scale.

Attention!

1. If student missed without plausible reason more than 20% of lessons student receives «F (Fail)» grade;
  2. If for two attestations student receives 29 or less points, this student is not accepted to final exam and for all course he (she) receives «F (Fail)» grade;
  3. If student receives on final exam 19 or less points, then independently on how many points he (she) received for two attestations, in whole he (she) receives «F (Fail)» grade;
- In the case of missing or being late for final exam without plausible reason, independently on how many points he (she) received for two attestations, in whole he (she) receives «F (Fail)» grade.

**Academic Policy:**

- Cheating, duplication, falsification of data, plagiarism are not permitted under any circumstances!
- Students must participate fully in every class. While attendance is crucial, merely being in class does not constitute “participation”. Participation means reading the assigned materials, coming to class prepared to ask questions and engage in discussion.
- Students are expected to take an active role in learning (the instructor will provide the information and guidelines to do this).
- Students must come to class on time.
- Students are to take responsibility for making up any work missed.
- Make up tests in case of absence will not normally be allowed.
- Mobile phones must always be switched off in class.
- Students should always show tolerance, consideration and mutual support towards other students.

**Students are encouraged to**

- consult the teacher on any issues related to the course;
- make up within a week’s time for the works undone for a valid reason without any grade deductions;
- make any proposals on improvement of the academic process;
- track down their continuous rating throughout the semester.

Senior Lecturer of SITE

*ALDAMURATOV Jomart*

*Minutes #26 of School of Information Technology and Engineering meeting on August 23, 2023*