AUTONOMOUS ORGANIZATION OF EDUCATION

"NAZARBAYEV UNIVERSITY"

Summer Research Program for

AOE "Nazarbayev Intellectual Schools" students

June 17 – June 28, 2019

Astana, 2019

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Abbreviations

NIS – AOE “Nazarbayev Intellectual Schools”

NU – AOE “Nazarbayev University”

NUSOM – Nazarbayev University School of Medicine

SEng – School of Engineering

SHSS – School of Humanities and Social Sciences

SMG – School of Mining and Geosciences

SST – School of Science and Technology

NU Schools program

WEEK 1 (June 17-21, 2019)

	Sunday, June 16	Monday, June 17	Tuesday, June 18	Wednesday, June 19	Thursday, June 20	Friday, June 21
9.00-10.30	Registration in dormitory	**SEng**	**SST**	**SMG**	**NUSOM**	**SHSS**
10.30 -11.00	**coffee break**	**coffee break**	**coffee break**	**coffee break**	**coffee break**	**coffee break**
11.00 - 12.30	Welcome speech of Provost/Vice-Provost for Research, Deans	**SEng**	**SST**	**SMG**	**NUSOM**	**SHSS**
12.30 -13.30	**Lunch**	**Lunch**	**Lunch**	**Lunch**	**Lunch**	**Lunch**
13.30 - 15.00	Placement in dormitory; Briefing on safety measure and logistics	**SEng**	**SST**	**SMG**	**NUSOM**	**SHSS**
15.00 - 15.30		**coffee break**	**coffee break**	**coffee break**	**coffee break**	**coffee break**
15.30 -17.00		**SEng**	**SST**	**SMG**	**NUSOM**	**SHSS**

School of Engineering projects description

Project 1

1	Project's title	**Arduino Electronics Project**
2	Responsible School's representatives	**Grant Ellis**
3	Assisting School's representatives	Nurzhan Shaimoldin – ECE Laboratory Assistant Rabbonii Ikromzoda – ECE Laboratory Assistant Kanat Turebekov - Senior Laboratory Coordinator, School of Engineering
4	Duration	3 hours
5	Number of students per group	Approximately 25
6	Number of groups per day for this project	ONE – during morning
7	Necessary equipment	1. Electronics laboratory 2. Arduino UNO starter kits [15 – 25] 3. PC [15 – 25] 4. Electronic components including wires, LEDs, and sensors.
8	Necessary consumables	Various additional electronic consumables / components
9	Location	3e322 Telecommunications Lab, 3e321 Electronics Lab
10	Skills necessary before the project	Basic Computer Skills
11	Description of the project	Students will begin by learning about simple electronic breadboard followed by the Arduino graphical user interface. Students will then assemble and test electronic several circuits using Arduino UNO with circuit prototype board including use of sensors, LEDs, shift registers.
12	Involvement of students in the project	Students will learn about electronic circuits and programming using 'hands-on' approach.

Project 2

1	Project's title	**Introduction to 3D Printing and Modelling for Airfoil Design**
2	Responsible School's representatives	**Konstantinos Kostas**
3	Assisting School's representatives	Luis Rojas and Bolat Ramazanov (or any other lab technician that can operate school's wind tunnel)

4	Duration	3hrs
5	Number of students per group	up to 25
6	Number of groups per day for this project	up to 1
7	Necessary equipment	1. Computer Lab, 2. 3d Modelling CAD package (Rhino 3d), 3. Access to a PLA/ABS 3d printer, 4. Wind tunnel
8	Necessary consumables	1 kg of PLA filament
9	Location	Computer Lab: Block 3 Room 3e.227 (or 3e217) Aerospace Laboratory: Block 3 Room 3e.117-8
10	Skills necessary before the project	Basic Computer Skills
11	Description of the project	A short introductory section on airfoils is followed by a gentle introduction to 2d sketching and 3d modelling. This tutorial ends with a short introduction to 3D printing and slicing software packages. At the end, the performance of several 3D printed objects and airfoils is evaluated using an actual wind tunnel.
12	Involvement of students in the project	Students learn how to design free-form shapes in CAD packages and how to prepare solid models for 3d printing. Additionally, a series of wind tunnel experiments using their designs are performed.
13	Knowledge/skills introduced after the project	Basic drafting skills, 3d solid modelling skills and basic knowledge of the modelling prerequisites for 3d printing. Short introduction to experimental work via the wind tunnel demonstration.

Biographies of the Project Designers

Dr. Eng. Konstantinos Kostas is an Assistant Professor at the department of Mechanical & Aerospace Engineering, School of Engineering, Nazarbayev University focusing on Computer Aided Geometric Design & Design Optimization Methods. He holds a diploma of Naval Architecture & Marine Engineering from the National Technical University of Athens (NTUA) and a PhD in Virtual Reality and Applications to Ship Life-Cycle Modelling from the same institution. He has spent several years as a researcher in NTUA, participating in numerous European Community projects and publishing in journals and conferences ranging from the journal of Computing and Computer Aided Design to Computer Methods in Applied Mechanics and Engineering, and international conferences on Pedestrian and Evacuation Dynamics. Between 2010 and 2015, he was serving as an Assistant professor in the department of Naval Architecture, Technological and Education institute of Athens (TEI-A) and from August 2015 has joined the School of Engineering, Nazarbayev University. His book on "3D Design & Computations in Rhino3D", ISBN 9789609732086, is used as a course book in both NTUA and TEI-A and a chapter on "Boundary-Element Methods and Wave Loading on Ships" appeared on Wiley's Encyclopedia on Computational Mechanics, eds Erwin Stein, René de Borst and Tom Hughes. His interests span from Virtual Environments, interference detection and crowd modelling to parametric geometrical modelling and application of isogeometric analysis to Boundary-Element methods.

Dr. Grant A. Ellis completed his PhD in Electrical Engineering at the University of Washington in Seattle. He has 20 years of engineering experience in radio frequency and microwave circuit design in the United States and in SE Asia. His teaching and research interests are radio frequency integrated circuit design, antenna design, and electromagnetic propagation.

School of Science and Technology projects description

Project 1

1	Project's title	**Fluorescent Silica colloidal particles**
2	Responsible School's representatives	TBA
3	Assisting School's representatives	TBA
4	Duration	1.5 hour
5	Number of students per group	25
6	Number of groups per day for this project	1
7	Necessary equipment	3 heating magnetic stirrer 3 conical flasks with caps 3 magnetic bars 3 UV lamps Spectrofluorometer (1 available in room 7502)
8	Location	Block 7, floor 3, Room 7307
9	Skills necessary before the project	Basic chemistry lab skills
10	Description of the project	Students will practice the synthesis of fluorescent silica colloidal solutions. Obtained samples will be used for latent fingerprints detection.
11	Involvement of students in the project	Students will participate during solution preparations, photoluminescence measurements and fingerprint detection.
12	Knowledge/skills introduced after the project	Students will acquire knowledge in material synthesis, its characterization and application.

Project 2

1	Project's title	**Advanced physics instructional lab hands-on experience**
2	Responsible School's representatives	TBA
3	Assisting School's representatives	TBA
4	Duration	1.25h
5	Number of students per group	25

6	Number of groups per day for this project	1
7	Necessary equipment	Present
8	Location	Block 7, floor 3, Room 7302
9	Skills necessary before the project	Basic lab skills
10	Description of the project	Students get to use advanced educational lab equipment under supervision. They are given an overview of experiment design in real life.
11	Involvement of students in the project	Students get to use the various setups from the UG instructional physics lab to get hands-on experience
12	Knowledge/skills introduced after the project	Use of basic remote sensors (force, distance, weight, multi-meter…), scientific principles of experiment design and results measurements and analysis.

Project 3

1	Project's title Track 1: Track 2:	**Molecular Biology and Microbiology** **DNA extraction** **Enzymatic activities of Bacteria**
2	Responsible School's representatives	TBA
3	Assisting School's representatives	TBA
4	Duration	1h 20min
5	Number of students per group	25
6	Number of groups per day for this project	25
7	Necessary equipment	Centrifuge, 37C incubator
8	Location	8 lab benches in 7410 (Block 7, floor 4) and 16 benches in 7407 (Block 7, floor 4)
9	Skills necessary before the project	Safety rules and aseptic techniques in biology labs
10	Description of the track 1: Description of the track 2:	(1)Students will learn how to use a quick and easy procedure that scientists routinely use to extract DNA from different organisms. Students will collect cheek cells, then extract, precipitate, and bottle their DNA. (2)Students will be given plates containing differential and selective media inoculated in advance with different kinds of

		microorganisms. Students will learn how to distinguish biochemical activity of bacteria by interpreting their growth pattern/color change taking place in the medium.
11	Involvement of students in the project	These are all wet labs where students will fully interact with TAs and Instructor to perform experimental procedures and answer questions
12	Knowledge/skills introduced after the project Track 1: Track 2:	(1) Understanding of DNA properties and learning of an easy method to isolate DNA for use in cutting-edge research. (2) Learning methods used to distinguish bacteria based on their various enzymatic activities/use of different media and their composition/enhancing of a critical analysis of results

Project 4

1	Project's title	**Basics of 3D printing**
2	Responsible School's representatives	TBA
3	Assisting School's representatives	TBA
4	Duration	1.25h
5	Number of students per group	25
6	Number of groups per day for this project	1
7	Necessary equipment	Present
8	Location	Block 7, Floor 3, room #7322
9	Skills necessary before the project	basic computer usage skills
10	Description of the project	Students are given a brief history and operational principle of 3D printing. Then all have a chance to create a 3D model in SolidWorks (tutorials available), best model is printed – start of the print process is demonstrated.
11	Involvement of students in the project	Students are given access to the 3D modeling software (SolidWorks), they can start their own model by following numerous available tutorials that come with the software.
12	Knowledge/skills introduced after the project	Use of 3D software, basics of printing on a 3D printer

Biographies of the Project Designers

Dr. Anara Molkenova is a postdoctoral researcher at the Department of Chemistry of School of Science and Technology of Nazarbayev University. She received her PhD in chemical engineering from the Tokyo Institute of Technology in 2015, her PhD thesis focused on making breakthroughs in the development of high-power energy storage systems. At this moment she joined the research group of Professor Timur Atabayev. Their cutting-edge work focuses on the development of highly fluorescent and biocompatible nanoparticles for biomedical applications. Anara was awarded an Oxford Instruments Plasma Technology Award in 2011 and a Hosokawa Powder Technology KONA award in 2015, which recognized her research contribution in the area of nanotechnology and powder technology. She is currently a member of the Materials Research Society USA, the Society of Chemical Engineers Japan, and the Electrochemistry Society of USA and Japan.

Dr. Thomas Oikonomou joined our faculty in the summer of 2015 the Physics Department as an Assistant Professor. His experience covers diverse research areas from various scientific disciplines, i.e., non-equilibrium Statistical Mechanics, Symbolic Dynamics and Time-Series Analysis, Thermostatistics of Meta-equilibrium States, Breathers, Plasmonic Systems, Long Range Correlations, Applications in DNA and Bioinformatics. Recently, his research interests are focused on the mathematical and physical foundation of the use of deformed entropies yielding maximum probability distributions of power-law form. Additional research topics include systems of a few degrees of freedom and heat bath finiteness effects dominating in the quantum thermodynamic regime.

School of Humanities and Social Sciences projects description

Project 1

1	Project's title	**Economics**
2	Responsible School's representatives	**Bota Borina**
3	Assisting School's representatives	
4	Duration	90 mins
5	Number of students per group	
6	Number of groups per day for this project	1
7	Necessary equipment	
8	Location	Block 8
9	Skills necessary before the project	
10	Description of the project	Unemployment and inflation are the key macroeconomic indicators that are used to analyze the state of economy at a given period of time. During this lecture the students will learn how to define and calculate unemployment and inflation. Activities: • Lecture • Problem solving in groups • Searching for unemployment and inflation statistics online • Short quiz (multiple-choice)
11	Involvement of students in the project	
12	Knowledge/skills introduced after the project	Students will learn how to define and calculate unemployment and inflation.

Project 2

1	Project's title	**Anthropology**

2	Responsible School's representatives	**Alima Bissenova**
3	Assisting School's representatives	
4	Duration	90 mins
5	Number of students per group	
6	Number of groups per day for this project	1
7	Necessary equipment	
8	Location	Block 8
9	Skills necessary before the project	
10	Description of the project	In this 90-minutes-long introductory class, I will give a 30-minutes lecture on the history of the discipline of Anthropology in the United States and Great Britain and the discipline of Ethnology in the Russian Empire and Soviet Union. Having talked about the history of the formation of the discipline in different imperial settings, I will then discuss how contemporary Anthropology is trying to redeem its colonial heritage. In the next 30 minutes, students will divide into three groups to read three short ethnographic excerpts on contemporary Kazakh culture. In the remaining 30 minutes, we will come together as a class to talk about ethnography as a genre that defines the discipline and discuss what the three ethnographic excerpts that we just read tell us about "our own culture," whether there is one Kazakh culture with capital "C", and how we can meaningfully talk about "culture." Then, turning our eyes on the figure of anthropologist, we will critically analyze the conditions of production of these ethnographies and their claims to authority.
11	Involvement of students in the project	
12	Knowledge/skills introduced after the project	Students will be able to explain what is meant by 'culture', using examples from their own experience.

Project 3

1	Project's title	**Chinese**
2	Responsible School's	**Lili Zhang**

	representatives	
3	Assisting School's representatives	
4	Duration	90 mins
5	Number of students per group	
6	Number of groups per day for this project	1
7	Necessary equipment	
8	Location	Block 8
9	Skills necessary before the project	
10	Description of the project	Students will be introduced to the basics of Chinese language through pinyin, including pronunciation and writing.
11	Involvement of students in the project	
12	Knowledge/skills introduced after the project	Students will be able to speak and write a few words in Chinese.

Project 4

1	Project's title	**Philosophy**
2	Responsible School's representatives	**Mihnea Capraru**
3	Assisting School's representatives	
4	Duration	90 mins
5	Number of students per group	
6	Number of groups per day for this project	1
7	Necessary equipment	
8	Location	Block 8
9	Skills necessary before the project	
10	Description of the project	The discipline of logic studies truth, falsity, possibility, necessity,

		and correct argumentation. We will learn the elementary outlines of logic by using game-theoretic semantics. Game-theoretic semantics teaches the logical structure and interpretation of sentences by means of games between two players, one of whom wins by showing that a sentence is false, while the other wins by showing that it is true.
11	Involvement of students in the project	
12	Knowledge/skills introduced after the project	Students will be able to describe the basic elements of logic, and apply them to sentences to show whether they are true or false.

Biographies of the Project Designers

Mihnea Capraru is an assistant professor of philosophy at Nazarbayev University, having received his PhD from Syracuse University in 2015. His research is in philosophy of language, philosophy of mind, philosophy of language, and philosophy of cognitive science, while his teaching interests also encompass logic, metaphysics (including action theory), and general philosophy of science.

Alima Bissenova is an Assistant Professor of Anthropology in the department of Sociology and Anthropology at Nazarbayev University. She obtained her PhD in 2012 at Cornell University, has Bachelor's degree in Kazakh language and literature from the Karaganda State University and a Master's in Middle East Studies. In her current research, she investigates the social implications of post-Soviet development through the prism of the changing environment of Kazakhstan's cities, newly emerging lifestyles and subjectivities, strategies of mobility, and new religious sensitivities in the urban space. She is in the process of completing her first book manuscript Learning to Be Bourgeois: the Rise of the Middle Classes in Post-Soviet Kazakhstan. She is also leading an interdisciplinary project which deals with the issues of coloniality of knowledge, contemporary and historical intellectual networks, knowledge transfers and transformations of cultural capital from

Bota Borina is a teaching assistant in the Department of Economics at Nazarbayev University. She received her PhD from Kazakh Agrotechnical University (Astana) and Institute of Agricultural Development in Central and Eastern Europe (IAMO) (Halle, Germany) in 2007. She did her Ph.D thesis under the German- Kazakh Research Project «Crop insurance in Kazakhstan: Ways of building a sound institution promoting agricultural production». Her research were focused on implementing the new weather based schemes of crop insurance in North regions of Kazakhstan, systemic risk assessment and risk management in agriculture. She continued her research as visiting scholar at Pennsylvania State University (2007) and Mississippi State University (2013) under the two programs financed by U.S. Department of State, Bureau of Educational and Cultural Affairs (ECA) and the Council for International Exchange of Scholars(CIES)): Fulbright and Junior Fellowship Development Program.

Lili Zhang is an instructor in Chinese Language at Nazarbayev University since 2019. She obtained her second Master Degree in Second Language Acquisition from University of Maryland, College Park in 2018, and received her first Master Degree in Chinese Linguistics and Applied Linguistics from Beijing Language & Culture University in 2012. Her Bachelor degree in Teaching Chinese as a Second/Foreign Language was obtained from Hebei University of Economics & Business in 2009.

She taught Chinese language at Drake University in 2018, at University of Maryland, College Park in 2017, and at China Youth University of Political Sciences from 2012 to 2015. She also taught Chinese language in a variety of Summer/Winter Language Programs, such as Harvard University & Beijing Language & Culture University Summer Program, Bohai College Winter Program.

Her research interest is in teaching Chinese characters, Task-based language teaching, semantic development of vocabulary acquisition, collocation acquisition, the influence of learning environment

on language acquisition, while her teaching interests are how to teach characters effectively, individual difference, practice and automaticity, learning aptitude, etc.

School of Mining and Geosciences projects description

Project 1

1	Project's title	**Mining Engineering Exercises**
2	Responsible School's representatives	Saffet Yagiz, Assoc. Prof.
3	Assisting School's representatives	Gulam (Technician)
4	Duration	45 min lecture; 1.5 hours Lab session (about 2.5 hrs)
5	Number of students per group	20-25 each day
6	Number of groups per day for this project	One group per day in tentative
7	Necessary equipment	Room for lecture; rock sample for testing at lab
8	Location	Block 6, Room 6.xxx and Rock Mechanics Lab.
9	Skills necessary before the project	N/A
10	Description of the project	Mining Engineering -is the practice of applying engineering principles to the evaluation, planning, operations, closure and reclamation of mines in a safe, profitable, and socially acceptable way- *is introduced for students using both lecture and laboratories as an about 2.5 hrs. exercise.* In the lecture students will learn what is mining/engineering means and mining application in the earth. Also, students will be taught *how to perform simple laboratory tests* for solving simple mining engineering problems.
11	Involvement of students in the project	Tests will be performed together w/students. They will be interact with instructor and technician in the class and laboratory.
12	Knowledge/skills introduced after the project	By the end of this project, student will be able to; - Understand what is mining engineering and related topics. - How to perform some tests to obtain the earth material properties such as strength, density, hardness, abrasivity and also boring and sample preparation. - Understand introductory information about mining and its application in the earth; Also they will be familiar with simple rock tests and test equipment

Project 2

1	Project's title	**From invisible atoms to awesome minerals**
2	Responsible School's representatives	Laurent Richard, Associate Professor
3	Assisting School's representatives	Zarina Mukhamedyarova, Graduate Student
4	Duration	1 h 30 minutes
5	Number of students per group	10 – 12
6	Number of groups per day for this project	4
7	Necessary equipment	Minerals, rocks, lenses
8	Location	SMG, Block 6, room 6.327
9	Skills necessary before the project	Observational skills
10	Description of the project	We will first look at atomic arrangements in crystals, and relate these to the macroscopic appearance and properties of minerals. We will perform some hardness and streak tests, relate the color of a few minerals to the presence of trace elements, and discuss the density of Pb- and Ba-containing minerals.
11	Involvement of students in the project	They will have to handle mineral samples and note their observations on a worksheet.
12	Knowledge/skills introduced after the project	The students will know how to relate atomic arrangements in solids to macroscopic properties, will learn the names of a few important minerals.

Project 3

1	Project's title	**Geology and mining of the uranium deposits of Tortkuduk, south-central Kazakhstan**
2	Responsible School's representatives	Fidelis Suorineni, Professor Laurent Richard, Associate Professor
3	Assisting School's representatives	Nurlan Akhmetov, Laboratory Coordinator
4	Duration	1 h 30 minutes
5	Number of students per group	10 – 12
6	Number of groups per day for this project	4
7	Necessary equipment	A box of core samples from the Tortkuduk deposit together with a Geiger counter (both provided by the geologists of KATCO), thin sections of the rocks hosting the uranium ore (provided by Askar Munara), optical microscope.
8	Location	SMG, Block 6, room 6.134
9	Skills necessary before the project	Observational skills
10	Description of the project	We will briefly introduce the geology of these deposits and explain how geological exploration and production is performed, see how thin sections of rocks are made in the laboratory, observe such thin sections under an optical microscope, and finally measure the radioactivity of to locate the uranium mineralization along a drilled core.

11	Involvement of students in the project	The students will look at rocks under the microscope and use a Geiger counter.
12	Knowledge/skills introduced after the project	The students will learn about ore deposits, rocks and minerals, basic uranium chemistry, and natural radioactivity.

Project 4

1	Project's title	**Rock Properties of Petroleum Engineers**
2	Responsible School's representatives	Muhammad Rehan Hashmet, Assistant Professor
3	Assisting School's representatives	Madiyar Koyanbayev, Laboratory Assistant
4	Duration	30 mins lecture, 1 hr Lab session
5	Number of students per group	10-15 students
6	Number of groups per day for this project	One group per day
7	Necessary equipment	Class room for lecture, and Porosimeter and permeameter
8	Location	TBA
9	Skills necessary before the project	N/A
10	Description of the project	We will briefly introduce some important rock properties for petroleum engineering and later on, the students will perform experiments to determine those rock properties.

11	Involvement of students in the project	During the lecture session, the students will have an opportunity to interact with the faculty and lab staff, and discuss some basic properties of rock. During lab session, the students will measure those properties and record them on the data sheet.
12	Knowledge/skills introduced after the project	By the end of this project, student will be able to; - Understand what is petroleum engineering and related topics. - How to conduct experiments to obtain some most important rock properties such as porosity and permeability of porous media. - Understand introductory information about petroleum engineering and different phases during exploration and production from oil and gas reservoirs.

Biographies of the Project Designers

Saffet Yagiz, Associate Professor, School of Mining and Geosciences
Dr. Saffet Yagiz joined the department of Mining Engineering at the School of Mining and Geosciences in the summer of 2017. He has an MSc degree from the University of Missouri and a PhD degree from the Colorado School of Mines in the USA. His main research interests are geotechnical; engineering rock mechanics, engineered geology, mechanized excavation and tunneling. He has authored over 80 publications in peer-reviewed scientific journals and proceedings and also two books. He is a recognized reviewer/editor of numerous mining, rock mechanics and geotechnical journals. He is known for the studies of developing the Modified CSM Model, TBM performance prediction formulas, and also proposing rock brittleness index and classification.

Laurent Richard, Associate Professor, School of Mining and Geosciences
Laurent Richard (Belgium, 1967) holds a Ph.D. in Geochemistry (Univ. of Strasbourg, France, 1993). He has been a researcher in theoretical geochemistry at the Univesity of California (Berkeley), an associate professor of geochemistry at the University of Lorraine (France), a consultant for oil companies and nuclear waste management agencies based in Barcelona (Spain). He joined Nazarbayev University in 2017, has developed the undergraduate curriculum of Geology, and is currently establishing the teaching collection of Mineralogy of the University.

Prof. Fidelis Suorineni, Professor, School of Mining and Geosciences
Dr. Suorineni has enviable knowledge in the broad spectrum of mining and geosciences, and has played leadership roles within this spectrum in Ghana, Canada and Australia. Prior to joining NU, Dr Suorineni worked at UNSW Sydney as Professor and Inaugural Chair of Mine Geotechnical Engineering in the School of Mining Engineering, Senior Research Engineer and Adjunct Professor with term appointments at Laurentian University, Sudbury, Canada Technology, Kumasi School of Mines, Tarkwa (Now University of Mines and Technology (UMaT)). Dr. Suorineni obtained his B.Sc. from the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana; M.Sc. from the University of Newcastle upon Tyne, Britain and Ph.D. from the University of Waterloo, Canada. Dr. Suorineni is a globally recognized award-winning academic with over 30 years' experience in teaching, research and consulting in Africa, North America and Australasia.

Muhammad Rehan Hashmet, Assistant Professor, School of Mining and Geosciences

Dr. Muhammad Rehan Hashmet is a Petroleum Engineering faculty member in School of Mining and Geoscience, Nazarbayev University since 2018. Prior to current position, Dr Rehan has worked as a Research and Teaching Associate in Petroleum Institute Abu Dhabi for 4 years. Dr. Rehan received his Doctor of Philosophy degree in Petroleum Engineering from Universiti Teknologi PERTONAS Malaysia in 2014. Dr. Rehan also holds M.Sc. and B.Sc. in Petroleum Engineering from University of Engineering and Technology, Pakistan.

School of Medicine projects description

Project 1

1	Project's title	**Virtual lab**
2	Responsible School's representatives	Dr. Eva Riethmacher
3	Assisting School's representatives	TBA
4	Duration	90 minutes
5	Number of students per group	25
6	Number of groups per day for this project	1
7	Necessary equipment	Computers and lobster program
8	Location	Computer lab, NUSOM
9	Skills necessary before the project	Basic knowledge in genetics
10	Description of the project	This project represents a program designed for students to follow a specific medical case from the patient's bedside to the diagnosis in the lab. It is an interactive program in which every student can participate individually and in groups.
11	Involvement of students in the project	Students will be diagnosing a patient in a virtual setting using molecular techniques.
12	Knowledge/skills introduced after the project	Students will gain knowledge in the following topics: -PCR -gel electrophoresis -cancer -tumor genes

Project 2

1	Project's title	**Introduction to Basic Life Support Skills using human patient simulators**
2	Responsible School's representatives	Dr. Vitaly Sazonov

3	Assisting School's representatives	TBA
4	Duration	90 minutes
5	Number of students per group	12-13
6	Number of groups per day for this project	2
7	Necessary equipment	Simulation Center equipped with five BLS manikins
8	Location	Simulation Center NUSOM, Level 5, Kerey-Zhanibek Khan Street 5/1, 010000
9	Skills necessary before the project	No prior skills are required
10	Description of the project	This project represents a program designed to provide an introduction to international standard of Basic Life Support (BLS). The students will complete a one-hour training course that provided theoretical background on sudden cardiac death (SCD) and a hands-on Cardio-Pulmonary Resuscitation (CPR) tutorial A clinical case will be introduced and discussed during the session. Also, the capability and learning space of the Simulation Center will be demonstrated and its ability to deliver expert multidisciplinary health care training
11	Involvement of students in the project	Students will be divided into groups and will use BLS manikins to obtain practical skills in case of cardiac arrest (both in adults and children) and case of choking. Also students will be taught to lead the rescue team before the Ambulance arriving and their leadership skills.
12	Knowledge/skills introduced after the project	• Introduction to most common cases of sudden cardiac arrest. • After the session, students will be able to ✓ Recognize cardiac arrest ✓ Activate the emergency response system ✓ Perform CPR with 1 or 2 rescuers for a victim of

		cardiac arrest ✓ Perform CPR for an adult, child, or infant victim ✓ Use an automated external defibrillator (AED) ✓ Provide rescue breathing for a victim of respiratory arrest Provide emergency care for the choking victim

Project 3

1	Project's title	**Introduction to Human Anatomy using a 3D visualization system**
2	Responsible School's representatives	Dr. Lyazzat Toleubekova
3	Assisting School's representatives	Lab Assistant
4	Duration	90 minutes
5	Number of students per group	12-13 students
6	Number of groups per day for this project	2
7	Necessary equipment	Virtual Anatomy Lab equipped with five Anatomage tables
8	Location	Virtual Anatomy Lab, NUSOM, Level 1, Room 143, Kerey – Zhanibek Khan Street 5/1
9	Skills necessary before the project	No prior knowledge is required
10	Description of the project	This project represents a program designed to provide an introduction to human anatomy using the interactive display system, Anatomage table. The program is offering a highly interactive approach to learning about human anatomy in a life-size scale with the help of innovative teaching methods. A clinical case will be introduced and discussed during the session.
11	Involvement of students in the project	Students will be divided into groups and use anatomage tables by performing virtual dissection and visualizing anatomical

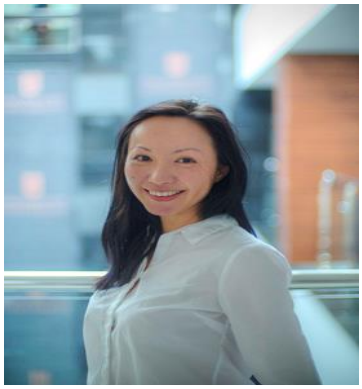
		structures in 3D.
12	Knowledge/skills introduced after the project	– Introduction to human anatomy and virtual dissection. – Students will be able to visualize bones, tissues, organs – Provision of the insight to clinical radiology – Application of clinical relevance

Project 4

1	Project's title	**Hand-on experience in the lab**
2	Responsible School's representatives	Dr. Eva Riethmacher
3	Assisting School's representatives	TBA
4	Duration	60 minutes
5	Number of students per group	25
6	Number of groups per day for this project	1
7	Necessary equipment	PCR machine, Gel electrophoreses, agarose gel
8	Location	Teaching lab, NUSOM
9	Skills necessary before the project	Basic knowledge of how to behave in a laboratory
10	Description of the project	A PCR will be set up and run on an agarose gel, enforcing the topics students have done in the virtual lab in a real life setting.
11	Involvement of students in the project	Students will be loading agarose gels and discuss the PCR results.
12	Knowledge/skills introduced after the project	- Introduction to PCR - Introduction to pipetting - Introduction to the analysis of results in a real laboratory setting

Biographies of the Project Designers

Dr. Eva Riethmacher, who is a scientist, who is originally from Germany. She received her PhD in Cologne, Germany. Since then she has worked in Medical Schools in Berlin (Germany), Hamburg (Germany), Southampton (UK) and since 2016 here in Astana. Her research focus is on different aspects of cancer development and inflammation. Her teaching mainly focuses on Fuel Metabolism and Inflammation.



Dr. Lyazzat Toleubekova, MBChB, is a fully registered medical practitioner who obtained her medical degree from St Andrews/Manchester Universities, United Kingdom. A proud holder of the International Bolashak Scholarship, Lyazzat has worked for NHS Greater Glasgow and Clyde and have acquired broad and diverse experience in management of acute and chronic illness in medical patients of all ages, in both district general and teaching hospital settings. Lyazzat is a certified Advanced Life Support Provider. Lyazzat started working as an instructor at the Nazarbayev University School of Medicine since August 2015.

Vitaliy Sazonov, MD is an Instructor. He graduated from Karaganda State Medical Academy in 2004. After successfully finishing graduate education he worked in different hospitals in Kazakhstan. Dr. Sazonov has been a member of Nazarbayev University School of Medicine (NUSOM) since October 2014. Dr. Sazonov was awarded the Medal for Contribution in Healthcare in Republic of Kazakhstan in 2014 by the Ministry of Health of the Republic of Kazakhstan.

Academic English

WEEK 2 (June 24-28, 2019)

	Group 1	Group 2
9.00-10.15	Academic Listening/Speaking	Academic Reading/Writing
10.15 -10.40	coffee break	coffee break
10.40- 11.55	Academic Listening/Speaking	Academic Reading/Writing
11.55 -12.45	Lunch	Lunch
12.45 - 14.00	Academic Reading/Writing	Academic Reading/Writing
14.00 -14.05	break	break
14.05 - 15.20	Academic Reading/Writing	Academic Listening/Speaking
15.20 -15.45	coffee break	coffee break
15.45 - 17.00	Academic Reading/Writing	Academic Listening/Speaking

Course Learning Outcomes (CLOs):

Listening

1. Listen for signals and discourse markers in lectures which indicate important ideas and examples.
2. Use several techniques for listening and note-taking, e.g. symbols and abbreviations, using lecture notes and PowerPoint slides, Venn diagrams, linear method, tables, T-charts, and Cornell notes.
3. Listen for transitions between ideas and recognize staging in lectures and presentations.
4. Take notes from detailed explanations and make summaries from such notes.
5. Identify a speaker's attitude in lectures and presentations.

Speaking

6. Give spoken explanations, prepare and present academic presentations.
7. Participate in group discussions and understand the rules of turn-taking, interrupting and preventing interruptions, suggesting, accepting and rejecting ideas.
8. Discuss a variety of issues, clearly expressing opinions and reasons for those opinions.
9. Make academic requests and replies.
10. Use persuasive language to convince others to adopt their point of view.
11. Participate in a Question and Answer session, exemplifying and requesting further information.

Reading

12. Understand and analyze the main points of complex texts.
13. Distinguish between fact and opinion, organize and summarize information from a variety of reading sources.
14. Use a variety of reading strategies to get important information from academic sources, such as speed reading, reading for gist, details and specific information, note taking and using graphic organizers;

Writing

15. Summarize, analyze and synthesize ideas from academic sources
16. Write a critical review of several sources following APA style

Dates	Lessons (1h15min)	Topic and CLOs	Learning Objectives	Activities	Resources
24.06.19	1	**Education and Work** **CLOs:** 1, 2, 4, 7, 8, 10	● gain confidence in discussing issues around education and work ● be able to listen for main points and examples ● practice introducing main points and examples ● learn to organize notes in different types of diagrams	● Introduction to the course ● Icebreaking activities ● Course expectations ● Listening & Note-taking introduction ● Organizing notes in a Venn diagram ● Group discussion	Earle-Carlin, S. (2015). *Q: Skills for success. Listening and speaking.* Oxford University Press. www.iqonlinepractice.com Other online resources
24.06.19	2		● discuss preferences and alternatives ● use intonation with choices ● gather information and ideas to plan a final presentation ● develop personal note-taking strategies	● Organizing notes in a T-chart ● Language Spotlight ● Pair-work: speaking activity ● TED talk video note-taking: task presentation	Earle-Carlin, S. (2015). *Q: Skills for success. Listening and speaking.* Oxford University Press. www.iqonlinepractice.com https://www.ted.com Other online resources
		Home Assignment		TED talk video note-taking	
24.06.19	3		● practice a variety of reading strategies such as reading for gist, details, specific information and speed reading	● Reading Strategies: for gist, details, specific information and speed reading	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading,*

			● learn about the main objectives of the course		*Writing, and Study Skills. Level 3*. Oxford: OUP
24.06.19	4	**Education and Work** **CLOs:** 12, 13, 14, 15	● practice a variety of techniques for organizing information from the text. ● use techniques to share information from reading texts in groups	● Reading. Note taking and graphic organizers.	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP
24.06.19	5		● learn about the requirements for the final project – academic essay ● familiarize themselves with academic sources on a set of topics. ● form topic groups according to their interests ● write a brief proposal explaining the choice of essay topic ● evaluate different sources and choose those relevant to the topic they're interested in	● Writing. ● Introduction to a final project. ● Choosing the topic for research. ● Academic sources. ● Assignment submission: Essay topic and Proposal	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP
25.06.19	6	**Science, Technology, and Medicine**	● gain confidence in discussing issues around science, technology, and medicine ● develop awareness of staging and transitions in academic and semi-academic talks and lectures ● practice identifying main ideas ● practice organizing notes	● Group discussion of students' note-taking strategies ● Listening & Note-taking ● Organizing notes in a chronological order using a timeline	De Chazal, E., and Moore, J. (2017). *English for Academic Purposes-Oxford EAP*. Oxford University Press.

		CLOs: 1, 2, 3, 6, 7, 8, 9	in different types of diagrams		Posters, whiteboard, and presentations
25.06.19	7		● be able to use a range of discourse signals for deduction, example, and summation ● develop an awareness of lexical cohesion and how to achieve it through the use of synonyms ● be able to understand and express orally some common mathematics ● practice recognizing transitions between ideas and lectures	● Speaking ● Language Spotlight ● "Literature" circles: task presentation	De Chazal, E., and Moore, J. (2017). *English for Academic Purposes-Oxford EAP*. Oxford University Press. Posters, whiteboard, and presentations
		Home Assignment		"Literature" Circles	
25.06.19	8	**Science, Technology, and Medicine** **CLOs:** 12, 13, 14, 15, 16	● learn outlining an academic essay by using model essays ● practice writing introduction including thesis statement by using an essay outline	● Writing. Structuring and developing an outline.	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP
25.06.19	9		● deconstruct a paragraph with the focus on the functional roles of topic, body, and final sentences ● practice in paragraph writing, including topic sentences, body sentences, and final sentences	● Writing. Developing a paragraph	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP

25.06.19	10		● find, evaluate, and read new sources related to the topic of interest ● create a draft outline for the final project ● write a draft introduction for the final project and summit for feedback	● Writing. Reading. Preparation for the final project ● Assignment submission: Outline and Introduction	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP
26.06.19	11	**What does it mean to be a Global Citizen?** **CLOs:** 1, 2, 4, 5, 6, 7, 8, 10, 11	● develop skills at interrupting as well as suggesting, accepting and rejecting ideas in discussions ● practice organizing notes in different types of diagrams ● use prior knowledge to prepare and organize notes ● be able to clarify information ● be able to gather information and ideas to give a group presentation	● "Literature" circles: group discussions ● Working with graphic organizers ● 3-minute presentations	Earle-Carlin, S. (2015). *Q: Skills for success. Listening and speaking.* Oxford University Press. www.iqonlinepractice.com http://www.litcircles.org/Overview/overview.html https://www.lauracandler.com/files/literacy/literature-circles/ Other online resources
26.06.19	12		● use different types of diagrams to take notes on problems and solutions ● identify facts and figures in comparison to opinions ● develop an awareness of how to cite sources of information ● identify and explain key components in a poster	● Overview of diagrams for note-taking and how they can be used ● Listening to a report: problems and solutions ● Personal note-taking strategies to identify facts	Earle-Carlin, S. (2015). *Q: Skills for success. Listening and speaking.* Oxford University Press.

				and figures ● Citations in speaking and presentations ● Final project requirements, brainstorming of preliminary ideas	www.iqonlinepractice.com Other online resources
		Home Assignment		Final Project	
26.06.19	13	**What does it mean to be a Global Citizen?** **CLOs:** 12, 13, 14, 15, 16	● learn how to effectively use the most common cohesive devices, incl. comparing/contrasting, cause/effect, exemplifying ● learn why and how to use hedging language ● practice building a coherent argument using cohesive devices	● Writing: Coherence, cohesion and hedging in academic writing	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP
26.06.19	14		● learn about standards of academic integrity and what constitutes plagiarism ● learn how to credit sources using APA style, incl. in-text citations and direct quotes ● learn effective paraphrasing techniques	● Writing: Crediting sources and avoiding plagiarism	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP
26.06.19	15		● apply the techniques they have learnt in lessons 13 and 14 to build a cohesive and coherent argument, crediting the sources they have used, and to draft the body of their Final Essay	● Writing: Writing the body of an essay ● Assignment submission: 2 draft body paragraphs of their Final Essay.	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP
27.06.19	16	**Project Presentation**	● identify the main points in a presentation ● identify cohesive words to confirm themes	Final project presentations ● viewing posters	De Chazal, E., and Moore, J. (2017). *English for Academic*

		CLOs: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	● compare and evaluate information in presentations	and preparing critical questions ● giving a poster presentation ● evaluating a poster presentation	*Purposes-Oxford EAP*. Oxford University Press. Posters, whiteboard, and presentations
27.06.19	17		● listen and participate in the question and answer stage of a poster presentation ● evaluate a poster and presentation	● Final presentation feedback ● Course summary and feedback from the students	De Chazal, E., and Moore, J. (2017). *English for Academic Purposes-Oxford EAP*. Oxford University Press. Posters, whiteboard, and presentations
27.06.19	18	**Project Presentation** **CLOs:** 12, 13, 14, 15, 16	● learn and practice language for summarizing ideas ● work on a final part of their essays ● learn about and practice making a reference list	● Writing: Conclusion. Summarizing. Referencing. ● Assignment submission: Conclusion	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP
27.06.19	19		● work in topic groups to provide and receive peer feedback along with teacher feedback ● finalize the final draft using the feedback	● Writing. Feedback session. Final draft ● Assignment submission: Final Draft	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP

27.06.19	20		● review one peer's essay from a different topic group ● reflect on their learning experience and achievement in the course both in discussion with peers and in filling a short questionnaire	● Peer review and course Reflection ● Assignment submission: Peer review of an essay	Philpot, S. & Curnick, L. (2011). *Headway Academic Skills: Reading, Writing, and Study Skills. Level 3*. Oxford: OUP