BS program, Oil & Gas Engineering Department

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty

Course Unit Title	English 1
Course Unit Code	ENGL 1101
Type of Course Unit	Compulsory
Level of Course Unit	1st year BSc program
National Credits	0
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	0
Practice (hour/week)	3
Laboratory (hour/week)	0
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Ildrimzade L.J, Shirinova N.M.
Name of Lecturer (s)	
Name of Assistant (s)	
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	

Course description:

Develops reading, writing, speaking, and listening skills by encouraging students to use language forms that they learn through reading and listening. The students are exposed to extensive reading both in and outside the classroom. They are encouraged to read a variety of texts such as short stories, academic articles, research reports, reviews and journalistic texts as well as chapters from textbooks.

Objectives of the Course:

During orientation you can expect to:

- to stimulate students interest in the subject and to encourage them to learn more about.
- to provide opportunities for students to work in teams.
- to lead students to deliver "individual works", to observe peers and provoke peer feedback.
- to develop students reading, writing, listening and speaking skills.
- to focus on language functions and structures.
- to increase the students' knowledge of vocabulary, specialized terms and idioms using in social situations.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	understand a simple personal letter about everyday life	
2	understand descriptions of events	2

3	use general language in discussions and talks	2,3
4	to do research work on particular topics covered through the module	2
5	expand their scientific reading skill and thinking skills	2,5
6	understand short narratives about everyday things, descriptions of events and feelings	2, 5
7	write a clearly structured story	
8	write a message for website giving factual information, recognize and correct common mistakes in writing	
9	write formal and informal letter using appropriate language	
10	use wide range of vocabulary in speaking	

Assessment Methods:

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines	1
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	1
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modeling and reservoir system design.	1
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	5
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4
7	Constant and continuous self-development and learning for a long time.	5
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	3
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	2
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production	1

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	**Unit 1 (a)** **Unit 1 (b)**	• **LIFE STORIES**. **Vocabulary**: Common phrases; question words. **Listening**: Celebrity profile: Jamie Oliver. **Speaking**: Talking about myself. **Reading**: Celebrity profile: Jamie Oliver. **Writing**: Questions with question words. Exercises. (W.B) • **SUPER COMMUTERS**. **Vocabulary**: Collocations (1): work; questions about travel **Listening**: Three commuters. **Speaking** People's jobs. How I travel. Day-today life. **Reading**: Super commuters 2.	

		Writing: Subject and non-subject questions. Exercises. (W.B)	
2	**Unit 1 (c, d)** **Unit 2 (a, b)**	• **TIME OFF. SMALL TALK**. **Vocabulary**: Free time activities. Frequency expressions. **Listening**: The British way of life? A free time survey. **Speaking**: My free time activities. A free time survey. **Reading**: The British way of life? **Writing**: Sentences about my free time. A class free time survey. • **BEGINNINGS. HOW WE MET.** **Vocabulary**: Past time phrases. Relationships (1). **Listening**: A free time survey. How Helen met Simon. How Ray met Claire **Speaking**: Fast food. My special meal. **Reading**: The man behind KFC. The Michelin guides. **Writing**: Past simple questions. Exercises (workbook).	
3	**Unit 2 (c, d)** **Unit 3 (a, b)**	• **COINCIDENCES. INTERNET DATING**. **Vocabulary**: Adjectives. Connecting words (1) **Listening**: The girl from Petrovka. **Speaking**: An interesting story. Internet dating. **Reading**: That's incredible! An online profile. **Writing:** Exercises (workbook). • **GETTING QUALIFIED**. **JOB-HUNTING** **Vocabulary**: Employment. Looking for a job **Listening**: An interpreter and a paramedic. **Speaking**: Things I have to do. Unemployment **Reading**: A referee's training. Letters to the editor **Writing**: Sentences about my job. Curriculum vitae (Work book. Portfolio 3).	
4	**Unit 3 (c, d)** **Unit 4 (a)**	• **WHAT A JOB. I'M REALLY SORRY**. **Vocabulary**: Word building: noun endings. **Listening**: Is that a real job? **Speaking**: Jobs I'd like and hate. Unpopular jobs. **Reading**: I'm just doing my job. **Writing**: Writing about a difficult situation. • **LOOKALIKES**. **Vocabulary**: Types of films; past participles. **Listening**: Types of films. **Speaking**: My film-watching habits. The last film I saw. **Reading**: A famous face? A Marilyn Monroe lookalike. **Writing**: True and false statements about my life experiences.	
5	**Unit 4 (b)** **Unit 4 (c, d)**	• **MY MUSIC**. **Vocabulary**: Types of music. **Listening**: Musical experiences. Three conversations. **Speaking**: My music. Interview with a rock star. **Reading**: A great film. (Work book. Portfolio 4) **Writing**: Describing a film (Work book. Portfolio 4) • **TV OR NOT TV? WHAT DO YOU THINK?** **Vocabulary**: TV nouns and verbs. *-ed* and *-ing* adjectives. **Listening**: Are you a telly addict. **Speaking**: Questions about TV. *-ed* and *–ing* questions. Free education. Agree or disagree? **Reading**: A TV questionnaire. Kill your TV! **Writing**: Exercises. (Workbook).	

6	**Unit 5 (a, b)** **Unit 5 (c, d)**	• **A CROWDED PLANET**. **NEVER TOO OLD**. **Vocabulary**: The environment. Collocations (2). **Listening**: Our future – the Earth in 2030. Retirement plans. **Speaking**: The environment. Life in the future. **Reading**: The environment. Language school brochures. (Work book. Portfolio 5) **Writing**: My plans, hopes and ambitions. • **CONSERVATION WORKS**. **A CHARITY EVENT**. **Vocabulary**: Verbs and prepositions. **Listening**: Elephant corridors. A WWF charity event. **Speaking**: My wildlife experiences. **Reading**: Face-to-face with a gorilla. A WWF charity event **Writing**: Formal and informal writing. Exercises (workbook).	
7	**Unit 6 (a, b)** **Unit 6 (c, d)**	• **TEENAGERS. ROLES PEOPLE PLAY**. **Vocabulary**: Adjectives (2): character. Relationships (2). **Listening**: Jake's wedding. **Speaking**: Comparing today's and past times' teenagers. The roles I play in the life. **Reading**: Living with the enemy. **Writing**: Sentences comparing me and my family. Exercises • **FAMILY BUSINESS. CALL ME BACK**. **Vocabulary**: Adjectives and prefixes (un-; in-; im-; dis-) **Listening**: Family business Parts 1 and 2. **Speaking**: Using the phone. Taking and leaving messages. **Reading**: Soap update: Family Business. **Writing**: Messages, notes. Exercises (Workbook).	
8	**Unit 7 (a)** **Unit 7 (b)**	• **50 PLACES TO GO**. **Vocabulary**: Travel. **Listening**: Holiday arrangements. **Speaking**: The top five holiday places. **Reading**: A travel blog. A holiday itinerary. **Writing**: Exercises (Workbook). • **WHAT ARE YOU TAKING?** **Vocabulary**: Things we take on holiday; quantity phrases. **Listening**: Packing for a holiday. **Speaking**: Going on holiday. **Reading**: Going on holiday. **Writing**: Exercises (workbook).	Midterm
9	**Unit 7 (c, d)** **Unit 8 (a, b)**	• **WISH YOU WERE HERE. IT DOESN'T WORK**. **Vocabulary**: Phrases with ***go***. **Listening**: The world's most unusual hotels. **Speaking**: Hotels. Questions with "***go***". **Reading**: The world's most unusual hotels. **Writing**: A letter of complaint. • **HOME SWEET HOME. MEET THE PARENTS**. **Vocabulary**: Describing your home. Going to dinner. **Listening**: A lighthouse and a motorhome. Advice on going to dinner. **Speaking**: Describing my home. **Reading**: A lighthouse and a motorhome. Places to visit in my country. **Writing**: Questions with "How long" and follow –up questions.	

10	**Unit 8 (c)** **Unit 8 (d)**	• **CULTURAL DIFFERENCES**. **Vocabulary**: Common verbs. **Listening**: Advice on giving presents. **Speaking**: Personalized questions. Giving presents. **Reading**: Culture shock! **Writing**: Tips on how to behave in my country. • **WHAT'S IT LIKE?** **Vocabulary**: Adjectives (3). **Listening**: What's Dublin like? **Speaking**: A town/ city I know well. **Reading**: Studying abroad. An article (Work book. Portfolio 8) **Writing**: Exercises (workbook).	
11	**Unit 9 (a, b)** **Unit 9 (c, d)**	• **PROBLEMS, PROBLEMS. SLEEPLESS NIGHTS**. **Vocabulary**: Everyday problems. Adjectives (4); feelings **Listening**: Three problems. Jims' business trip. New parents. **Speaking**: What will you do if……? **Reading**: A personal email asking for advice. **Writing**: First conditional questions. Sentences about problems in my life. • **NOISY NEIGHBORS. INVITATIONS**. **Vocabulary**: Phrasal verbs. **Listening**: Me and my neighbors. **Speaking**: Problems in neighborhood. **Reading**: Nightmare neighbors. Dinner plans. **Writing**: An invitation letter to dinner.	
12	**Unit 10 (a, b)** **Unit 10 (c, d)**	• **THE COLLECTORS**. **SHOPPING TRENDS**. **Vocabulary**: Verbs often used in the passive. **Listening**: Memorabilia. Shopping now and then. **Speaking**: Buying & selling. Passive quiz. Shopping habits **Reading**: The memorabilia business. The story of eBay. A short website article. (Work book. Portfolio 10) **Writing**: Exercises (workbook). • **FASHION VICTIMS. IT SUITS YOU**. **Vocabulary**: Clothes shopping. **Listening**: Gianni Versace. **Speaking**: Clothes. **Reading**: The Gucci story. Are you a fashion victim? **Writing**: Connecting words (3). Giving your opinion. (Work book. Portfolio 10).	
13	**Unit 11 (a)** **Unit 11 (b)**	• **GUESS WHAT?** **Vocabulary**: Collocations (3). **Listening**: I've just lost my job. **Speaking**: Getting ready to move house. **Reading**: Three messages. **Writing**: Exercises. (Workbook). • **MURDER MYSTERY**. **Vocabulary**: Crime. **Listening**: A murder in the village. The murder trial. **Speaking**: Who murdered Jack Miller? Discussing the evidence. **Reading**: A story. (Work book. Portfolio 11) **Writing**: Exercises (workbook).	
14	**Unit 11 (c, d)**	• **IN THE NEWS. DID YOU?** **Vocabulary**: Guessing meaning from context.	

	Unit 12 (a)	**Listening**: Today's news. Four conversations. **Speaking**: How I get everyday news. My news habits. **Reading**: Burglars caught by stolen laptop. **Writing**: Echo questions. A narrative. (workbook) • **WORKING ABROAD.** **Vocabulary**: Money. **Listening**: I want to work abroad. He's wasting his money. **Speaking**: Working/studying abroad. **Reading**: Describing your goals. An online diary. (Work book. Portfolio 12) **Writing**: Sentences about my life.	
15	**Unit 12 (b, c)**	• **TAKING RISKS. GRAFFITI.** **Vocabulary**: Collocations (4) "take" and "get". Connecting words (2). **Listening**: The history of graffiti. **Speaking**: Are you a risk-taker? What would you do if…? My attitudes to graffiti. **Reading**: Risk-taker. Banksy – graffiti artist. **Writing**: Exercises (workbook).	
			Final

Recommended Sources

TEXTBOOK(S)

1. Chris Redston and Gillie Cunningham: Face2face. Pre-intermediate: Second Edition. Students' Book and Workbook. Cambridge University. 2013.
2. English Vocabulary in use. Pre-intermediate-Intermediate. Stuart Redman. 2017.

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written-Oral Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- In order for you (and your classmates) to be successful in this course, you must submit all of your work on time. This is especially important because so much of your grade depends on giving feedback and revising based on the feedback you receive.
- Drafts for peer review and peer review letters cannot be submitted after the class period they are due (i.e. they receive a zero), unless you've made arrangements with the lecturer.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industry University General Student Discipline Regulations.

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42

Presentation	1	10	10
Tutorials	16	1	16
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	1	14	14
Final Examination	1	3	3
Preparation for final exam	1	20	20
Total Workload			**164**
Total Workload/30(h)			**≈ 5.5**
ECTS Credit of the Course			**6**

BS program, Oil & Gas Engineering Department

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty

Course Unit Title	Calculus I
Course Unit Code	MATH 1101
Type of Course Unit	Compulsory
Level of Course Unit	1st year of OGEN program
National Credits	0
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Ph.D. Azimova G.M.
Name of Lecturer (s)	Ph.D. Azimova G.M.
Name of Assistant (s)	
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	none
Recommended Optional Programme Components	-

Course description:

In this course, the basic classical methods of mathematics, necessary for future engineers, are given. This course includes the following chapters of "Calculus I":

1. Elements of linear algebra and analytical geometry. Matrices and operations on matrices. Determinants.Basic properties,rules for calculation. Equation ofa straight line in plane and in space. Equation of a plane. Second –order curves. Ellipse, hyperbola, parabola.

2.Differential calculus of functions of one variable and its applications. Limit of a function. Continuity of a function. Derivative. Basic differentiation rules. Differentiation of Transcendental Functions. Basic theorems of differential calculus. Application of differential calculus to investigation of behavior of functions.

3. Complex Numbers. Operations on Complex Numbers. Geometric interpretation

4. Integration. Antiderivative and Indefinite Integral. Integration Methods. Integration of Rational Functions. Integration of Irrational Functions. Integration of Trigonometric Functions.

This course provides students possibility to achieve high level of mathematical knowledge.

Objectives of the Course:

The teaching students of backgrounds of Calculus needed for future chemical engineers. Students must know the basic principles of mathematics should be able to apply them. Studying mathematics requires the student to try solving problems using the knowledge they have gained.

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Learning Outcomes

At the end of the course the student will be able to	Assessment

1	Know and apply methods for finding limits and derivatives of single variable functions.	1,2,3,4
2	Find the maximum and minimum values of single variable functions.	1,2,3,4
3	Know and apply integration methods to find Indefinite integrals	1,2,4

Assessment Methods: 1. Final Exam, 2. Independent works 3. Midterm, 4. Seminars

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines	4
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	3
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modeling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	5
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team	4
7	Constant and continuous self-development and learning for a long time.	1
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	3
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	2

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Matrices and operations on matrices. Determinants.Basic properties,rules for calculation.	
2	[1]	Equation ofa straight line in plane and in space. Equation of a plane. Second –order curves. Ellipse, hyperbola, parabola.	
3	[1]	Complex Numbers. Operations on Complex Numbers. Geometric interpretation.	
4	[1], [2]	Limit of a function. Basic theorems on limits. Remarkable limits.	
5	[1], [2]	Continuity of a function. Points of discontinuity of a function. Properties of continuous functions	

6	[1], [2]	Derivative. Geometrical meaning of the derivative. Differential.. Table of derivatives. Basic differentiation rules.	
7	[1], [2]	Differentiation of Transcendental Functions	
8	[1], [2]	Basic theorems of differential calculus. Theorems of Rolle, Lagrange, Cauchy.L`Hospital`s rule.Indeterminate forms of the type $\frac{0}{0}, \frac{\infty}{\infty}$ .Taylor`s formula.	Midterm
9	[1], [2]	Application of differential calculus to investigation of behavior of functions. Testing functions for monotonicity. Extrema of functions.	
10	[1], [2]	Convexity and concavity of a curve. Point of inflection. Asymptotes of a curve.	
11	[1], [2]	Antiderivative and Indefinite Integral. Integration Methods	
12	[1], [2]	Integration of Rational Functions (Rational Fractions). Integration of Irrational Functions	
13	[1], [2]	Integration of Trigonometric Functions	
14	[1], [2]	Application of Integration	
15	15		Final

Recommended Sources

TEXTBOOK(S) 1. James Stewart Calculus. Early Transcendentals. McMaster University and University of Toronto. Printed in USA, 2014.

2. Thomas`Calculus. George B. Thomas. Massachusetts Institute of Technology.2004

3. Calculus. Ron Larson. Bruce Edwards ,2014

4. A.F. Bermant , I.G.Aramanovich. Mathematical Analysis. Moscow. 2005

Assessment		
Attendance		Less than 25% class attendance results in NA grade
Independent works	20%	
Seminars		
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of University Guidelines for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students can use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	8	8
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	1	14	14
Final Examination	1	3	3
Preparation for final exam	1	18	18
Total Workload			**172**
Total Workload/30(h)			**≈ 5.73**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Intro to Petroleum Engineering
Course Unit Code	OGEN 1101
Type of Course Unit	Compulsory
Level of Course Unit	1st year BSc program
National Credits	3
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	-
Practice (hour/week)	3
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Prof. Doctor Suleymanov Eldar Mammad
Name of Lecturer (s)	Prof. Doctor Suleymanov Eldar Mammad
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	
Recommended Optional Programme Components	

Course description:

" Intro to Petroleum Engineering " by teaching special subjects in the development of the "Oil And Gas engineering" specialties relating to the subject of training subjects to occupy an important place.Enhanced oil recovery technologies are also being used for in-situ extraction of organic pollutants from permeable media. In these applications, the extraction is referred to as cleanup or remediation, and the hydrocarbon as product. Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

By the end of the course the students should be able to learn :

- **Provide overview of modern Intro to Petroleum Engineering industry**
- **Provide skillful understanding of Intro to Petroleum Engineering theory**
- **Perform advanced Intro to Petroleum Engineering and well planning and operations related calculations**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modeling and reservoir system design.	5

4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Facilities and processes	
2	[1], [2]	Exploration	
3	[2]	Upstream	
4	[1], [2]	Midstream	
5	[1], [2]	Refining	
6	[1]	Petrochemical	
7	[1]	Reservoir and wellheads	
8			Midterm
9	[1], [2]	The upstream oil and gas process	
10	[1], [2]	Midstream facilities	
11	[1], [2]	Refining methods	
12	[1], [2]	Petrochemical methods	
13	[1], [2]	Utility systems	
14	[1], [2]	Unconventional and conventional resources and environmental effects	
15			Final

Recommended Sources

1.Håvard Devold Oil and gas production handbook An introduction to oil and gas production, transport, refining and petrochemical industry Oslo, 2013

2. Hussain Rabia .Well Engineering & Construction.

3. John Ford. Drilling Engineering. HERIOT-WATT UNIVERSITY ,Department of Petroleum Engineering,Edinburgh, 2013

4. E.M.Suleymanov Deformation and service life of cement stone in well 2017

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	2	28
Presentation	1	5	5
Tutorials	-	-	-
Self-study	14	3	42
Midterm Examinations	1	3	3
Preparation for midterm exams	1	7	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**102**
Total Workload/30(h)			**≈ 3.4**
ECTS Credit of the Course			**3**

Course Unit Title	General Chemistry I
Course Unit Code	CHEM 1101
Type of Course Unit	Compulsory
Level of Course Unit	1st year OGEN program
National Credits	0
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	0
Laboratory (hour/week)	1
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Professor Minira M. Aghahuseynova
Name of Lecturer (s)	Professor Minira M. Aghahuseynova
Name of Assistant (s)	Professor Minira M. Aghahuseynova
Mode of Delivery	Face to Face, Laboratory.
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	-

Course description:

Historical development of chemistry science. Matter and measurements. Classification of inorganic compounds. Electronic structure of atom and molecule. Atomic properties and Periodic table. The main Laws of chemistry. Bonding Theory. Hybridization of AO. Classification and nomenclature of complex compounds. Bases of Thermodynamics.

Objectives of the Course:

The aim of the subject is formation of real comprehension of the world- scientific view of contemporary theories based on interrelation of nature laws and phenomena, systematization and deepening of students' knowledge in the field of chemistry. The main goal of the subject in the process of training is to master theoretical and practical basis of analytical chemistry for its application in solution of various ecological problems, analysis of water, seil, air and in chemical technology industry.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Define principal chemical concepts. Explain chemical composition and gas laws.	1,
2	Name the inorganic compounds.	1,2,3,4
3	Explain unit systems. Explain basic and derivative quantities.	1,4
4	Solve problems with the help chemical reactions. Define Chemical reactions. Compose reaction stoichiometry.	1
5	Explain Periodic table and properties of elements. Explain the properties of matter and chemical bonds by using electron configurations.	1,4
6	Define internal energy, state functions and Laws of thermodynamics.	1,3,4

Assessment Methods: 1. Final Exam, 2. Presentation, 3.Quizzes, 4. Seminars

Course's Contribution to Program		
		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	5
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modeling and reservoir system design.	4
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	4
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	3
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	3
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	2
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents			
Week	Chapter	Topics	Exam
1	[1]	Chemistry: Matter and measurement	
2	[1],[2]	Atoms. Molecules and ions. Chemical and physical properties	
3	[1],[2]	Stoichiometry: Chemical Calculations; Chemical reactions in aqueous solutions.	
4	[1],[2]	The main laws of chemistry	
5	[1],[2]	Atomic structure. Explaining the properites of elements.	
6	[1],[2]	Electron configurations, atomic properties and Periodic table.	
7	[1],[2]	Chemical bonds	
8	[2]	Bonding Theory and Molecular structure	Midterm
9	[1],[2]	Hybridization of atomic orbitals	
10	[1],[2]	Complex compounds. Verner's theory	
11	[1],[2]	Classification and nomenclature of complex compounds	
12	[1],[2]	State of matter and Intermolecular forces	
13	[1],[2]	Thermodynamics	
14	[1],[2]	Thermochemistry	
15			Final

Course Contents			
Week	Chapter	Topics	Exam
1	1	Familiarization with common laboratory equipment and safety rules.	
2	2	Classification of main classes of inorganic compounds	

3	3	Determination of the equivalent mass of metals.	
4	4	Molar mass and volume of carbon dioxide.	
5	5	İdentification of a compound:Chemical properties.	
6	6	Preparation and characterization of complex compounds	
7	7	Coordination complexes of the d-block metals	

Recommended Sources

TEXTBOOK(S)

1. **Steven S. Zumdahl, Susan A. Zumdahl Chemistry an atoms first approach: second edition, 2016 p.1216**
2. Thomas R. Gilbert, Rein V. Kirss, Natalie Foster, Stacey Lowery Bretz, Chemistry. An Atoms-Focused Approach (Second Edition) W.W.Norton@Company, London, 2018. p.**1256**.
3. **Catherine E.Housecroft, Edüin C.Constable, Chemistry, Prentice Hall, Upper Saddle River, United States, 2005, p.1316.**

Assessment

Attendance		Less than 25% class attendance results in NA grade
Presentation	20%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students cannot use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	6	6
Tutorials	15	2	30
Self-study	14	6	64
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14

Total Workload	**169**
Total Workload/30(h)	**≈ 5.63**
ECTS Credit of the Course	**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Introduction to laboratory safety & hazardous materials
Course Unit Code	LAB 1101

Type of Course Unit	Compulsory
Level of Course Unit	1 st year
National Credits	0
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Leyla Z.Vezirova
Name of Lecturer (s)	Leyla Z.Vezirova
Name of Assistant (s)	-
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	-

Course description:

Practicing safe science is an essential and fundamental responsibility of every laboratory worker. In this course, we will examine some common laboratory procedures, the hazards associated with these procedures, personal protective equipment that can be used to minimize associated with the laboratory accidents and emergency equipment that can be used in the event of specific types of laboratory accidents. In order to assure consumer safety and product quality, the biomedical and pharmaceutical industry is regulated by various government agencies. Compliance with the regulations and guidelines set forth buy these agencies is essential for successful product development, licensing and marketing. Therefore, we will examine some of the predominant regulations and the enforcing agencies.

Objectives of the Course:

Students should know more about lab safety culture, precautionary labels, Material Safety Data Sheets, using personal protective equipment, handling lab equipment safely, handling, storing and disposing of chemicals safely, using emergency equipment as well as safety planning.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	An understanding of Chemical Labeling & Safety. Demonstrate safe handling of chemicals and equipment in the laboratory	1,3
2	An understanding of Good Lab Practice, Good Manufacturing Practice & Fire Safety Demonstrate knowledge of Good Laboratory Practices (GLPs), Good Manufacturing Practices (GMPs) and Fire Safety	1,2,3
3	Ability to analyze Regulatory Agencies Demonstrate familiarity with international and federal regulatory agencies that impact the work of Biotechnology	2,3
4	An understanding of Emergency Equipment & Standard Operating Procedures Recognize and maintain various PPE and emergency equipment in a laboratory setting as well as evaluating Standard Operating Procedures (SOPs) and safety plans.	2,3

5	Understand and exercise professional and ethical norms.	1,3

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	3
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modeling and reservoir system design.	4
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	5
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4
7	Constant and continuous self-development and learning for a long time.	3
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	3
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	2
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[2] c.1, p.1.3-1.45	Introduction to the course: The Business of Biotechnology: The Transformation of Knowledge into Products	
2	[3] ch.2, p.9-35	The Lifecycle of Pharmaceutical Products	
3	[3] ch.4, p.59-85	Introduction to Product Quality Systems. Biotechnology and the Regulation of Medical Food Products.	
4	[3] ch.9, p.74-90	Documentation	
5	[3] ch.11, p.103-190	Quality Systems in the Production Facility. Quality Systems in the Laboratory	
6	[2] ch.7, p. 7.4-7.91 [2] ch.8, p. 8.3-8.39	Minimizing, controlling, and managing hazards. Chemical management: inspections, storage, wastes, and security.	
7	[3] ch.21, p.157-165	GMP , Quality Control/Quality Assurance Manager,	
8	[2] ch.2, p. 2.3-2.37	Fire Safety. Introduction to a Safe Workplace.	Midterm
9	[2] ch.1, p. 1.3-1.45 [2] ch.3, p. 3.3-3.47	Working Safely in the Laboratory:	
10	[2] ch.5, p. 5.3-5.131	General Considerations and Physical Hazards.	
11	[4] ch.2,3,4,5, p.25-160	Good Laboratory Practice (FDA/GLP Regulations, The Good Automated Laboratory Practices, Implementing GLPs in a Non-GLP Analytical Laboratory)	
12	[4] ch.6,7,8,9, p.167-240	Good Laboratory Practice (Controlling the Good Laboratory Practices Inspection Process, GLP Documentation, The FDA's GLP Inspection Program, The Future of the Good Laboratory Practice Regulations)	

13	[2] ch.1, p. 1.3-1.45	Working Safely with Chemicals	
14	[2] ch.4, p. 4.1-4.47	Working Safely with Toxic substances and Biological Agents	
15			Final

Recommended Sources

TEXTBOOK(S)

1. Basic methods for the biochemical Lab, Martin Holtzhauer, 2006.
2. Laboratory safety fo chemistry students, Robert H., Hill J.R., David C., 2010
3. Pharmaceutical Master Validation Plan, The Ultimate Guıde to FDA., GMP and GLP compliance, Syed Imtiaz Haider, 2001
4. Good Laboratory Practice Regulations, Sandy Weiberg, 2007

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Seminars	0%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and İndustry University

Course Policies

- Attendance of the course is mandatory.
- Material presented in the lecture as well as assigned readings will be included in testing.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Cheating and plagiarism will not be tolerated.
- Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	2	28
Presentation	1	3	3
Tutorials	12	1	12
Self-study	14	3	42
Midterm Examinations	1	3	3
Preparation for midterm exams	1	3	3
Final Examination	1	3	3
Preparation for final exam	1	9	9

Total Workload	**103**
Total Workload/30(h)	**≈ 3.43**
ECTS Credit of the Course	**3**

Course Unit Title	Industrial Economics and Finance

Course Unit Code	ECON 1101
Type of Course Unit	Compulsory
Level of Course Unit	1st year OGEN program
National Credits	0
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	0
Year of Study	
Semester when the course unit is delivered	
Course Coordinator	Rashid A. JABRAILOV
Name of Lecturer (s)	Rashid A. JABRAILOV
Name of Assistant (s)	Natavan IBRAHIMOVA
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	-

Course description:

Introduction to Industrial Economics. The evolution of the industry. Operations management. Production process and Productivity. Fixed and current assets. Efficiency and profitability analysis. Supply Chain Management (SCM). Push and Pull strategies. Decision making process. Corporate finance. Internal and external sources of finance.

Objectives of the Course:

The course is intended to lead students to an appreciation of the role of the energy industry in the global economy and the issues associated with managing resource based economies. The main objective of the course is to help students to understand:

- the potential role of energy resources to fulfill our energy demand
- forecasting our future energy demand
- how energy markets operate
- issues of resource management

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Describe and explain the determinants of the size and structure of firms and the implications of the separation of ownership and control	1,2,3,4
2	Describe and explain the pricing behaviour by firms with market power and its welfare implications	1,2,5

3	understand the need for government policies in various energy markets.	3,4,5
4	Make simple forecast about energy demand and use demand analysis models	1,2
5	Recognise and explain the basic determinants of market structure and the key issues in competition policy and regulation.	2,3,4

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Quizzes, 4. Midterm exam, 5. Seminars

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	2
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	2
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modeling and reservoir system design.	3
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	4
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	3
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	3
7	Constant and continuous self-development and learning for a long time.	5
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	2
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques	1
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production	2

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction to Industrial Economics. The evolution of the industry in Azerbaijan.	
2	[1]	Operations management. Production process within a company. Productivity	
3	[1]	Organization and administration of an industry. Classification of industries.	
4	[1]	Fixed and current assets	
5	[1]	Human resources of the company. Wages and compensations.	
6	[1]	Revenues and costs. Production costs. Cost and revenue analysis. Marginal revenue and marginal costs.	
7	[1]	Efficiency and profitability	

8	[1]	Management and its levels. Organizational functions of management.	Midterm
9	[1]	Supply Chain Management (SCM). Push and Pull strategies.	
10	[1]	Decision making process. Techniques of decision making. Types of decisions.	
11	[1]	Corporate finance. Internal and external sources of finance for a company.	
12	[1]	Taxes. Characteristics of taxes. Taxation system. Taxes paid by industries.	
13	[1]	Insurance services for industries. Types of insurance.	
14	[1]	Bank operations. Banks as the main financial partner of industries.	
15			Final

Recommended Sources

TEXTBOOK(S)

1. **Subhes C. Bhattacharyya. Energy Economics: Concepts, Issues, Markets and Governance. Springer 2011**

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Seminars (Quizzes)	0%	
Laboratories	0%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students cannot use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	13	13
Tutorials	14	1	14
Self-study	14	5	70

Midterm Examinations	1	3	3
Preparation for midterm exams	7	2	14
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**173**
Total Workload/30(h)			**≈ 5.76**
ECTS Credit of the Course			**6**

Course Unit Title	English 2

Course Unit Code	ENG 1201
Type of Course Unit	Compulsory
Level of Course Unit	1st year BSc program
National Credits	0
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	0
Practice (hour/week)	3
Laboratory (hour/week)	0
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Yunsurova A.S., Shirinova N.M.
Name of Lecturer (s)	
Name of Assistant (s)	
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisites	ENG 1101
Recommended Optional Programme Components	

Course description:

Develops students' autonomy, evaluation, analysis and research skills and synthesizing ability. Students will learn the discourse patterns and structures to be used in different essay types. An academic essay and a project report are assigned.

Objectives of the Course:

During orientation you can expect to:

- to stimulate students interest in the subject and to encourage them to learn more about.
- to provide opportunities for students to work in teams.
- to lead students to deliver "individual works", to observe peers and provoke peer feedback.
- to develop students reading, writing, listening and speaking skills.
- to focus on language functions and structures.
- to increase the students' knowledge of vocabulary, specialized terms and idioms using in social situations.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	understand a simple personal letter about everyday life	
2	understand descriptions of events	2
3	use general language in discussions and talks	2,3
4	to do research work on particular topics covered through the module	2
5	expand their scientific reading skill and thinking skills	2,5
6	understand short narratives about everyday things, descriptions of events and feelings	2, 5
7	write a clearly structured story	

8	write a message for website giving factual information, recognize and correct common mistakes in writing	
9	write formal and informal letter using appropriate language	
10	use wide range of vocabulary in speaking	

Assessment Methods:

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	1
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modeling and reservoir system design.	1
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	5
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	1
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4
7	Constant and continuous self-development and learning for a long time	4
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	1
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	1
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	1

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	**Unit 1A B.** p.6,7,9 **Unit 1C,D.** p.10-13	• **Be happy.** Vocabulary and Speaking: *Weekend activities*. Reading and Speaking: *The secret of happiness*. Listening and Speaking: CD1-1 **Love it or hate it.** Vocabulary and Speaking. *Likes and dislikes.* Reading. *Things we love and things we hate.* • **Join the Club!** Vocabulary and Speaking. *Adjectives (1); feelings.* Listening and Speaking CD1-4. Reading and Speaking. *Laughter is the best medicine.* **Real world** exercises. **Video 1**	
2	**Unit 2A.** p. 14,15 **Unit 2B p. 16,18**	• **Slow down!** Vocabulary and Speaking: *Collocations (1); work.* Listening and Speaking CD1-9, CD1- 10 • **Street food**. Vocabulary and Speaking; *Food and ways of cooking.* Speaking and Reading; *Street food Blog. Exercise 6a*	
3	**Unit 2C,D** p18 21 **Unit 3A, B p.22, 23, 24,25**	• **Sleepless nights.** Vocabulary and Speaking. *Sleep.* Listening: CD1-13. Reading, Vocabulary and Speaking. *It's a nightmare.* **Real world** exercises. **Video 2** • **The tourist trade.** Vocabulary and Speaking: Phrasal verbs (1); travel. Listening; CD1-19, CD1-23	

		Lonely planet. Vocabulary. Phrases with travel, get and go on. Speaking and Listening. The world's greatest travelers.	
4	**Unit 3 C,D.**p.22,24 **Unit 4 A p.30-31 Unit 4B p. 32-33**	• **Voluntourism.** Speaking and Listening. CD1-25. Reading, Vocabulary and Speaking; *Volunteers.* . **Real world** exercises. **Video 3** • **Musical experiences.** Vocabulary and Speaking. Collocations *Music.* Reading **Modern adventures**. Vocabulary and Speaking. and Speaking. Big River Man.CD1- 31. Exercise 7a	
5	Unit 4C,D. p 34-37 **Unit 5A**p.38 **Unit 5** Bp. 40-41	• **Unusual days out.** Speaking and Reading. The World's Weirdest museum. Listening and Speaking. CD1- 36. Real World Exercises **Video 4** • **Our new home**. Vocabulary and Speaking. *Homes.* Reading and Listening. CD1-42 **A load of old junk**. Reading, Vocabulary and Speaking. *Just get rid of it!* Listening and Speaking. CD1-44,CD1-47	
6	**Unit 5 C,D** p. 42-45 **Unit 6 A**. p 56-47 **Unit 6 B.** p. 48-49	• **Birthdays.** Speaking, Reading and Vocabulary. *Happy birthday to you! Listening* and Speaking. CD1 -48. **Real world exercises. Video5** • **Make up your mind.** Vocabulary, Speaking and Listening. CD1-5, Exercise 1, 2,8,9,10 **Fear for failure.** Speaking and Reading. *How to measure success.* Exercises 1,2 5 **Writing** giving an opinion	
7	**Unit 6 C,D.**p.50-54 **Unit 7 A.** p. 54-55 **Unit 7 B.** p. 56-57	• **Touch Wood.** Vocabulary and Speaking. Exercise 1-2 Listening. CD1-10. Speaking, Reading and Vocabulary. The secret of luck. **Real World**. Exercises. **Video 6** • **Have a go! Vocabulary and Speaking** *Goals and achievements.* Reading. *Have a go!* **Public holiday (What would you do?** Vocabulary and Speaking. *Computers*. Speaking and Listening CD2- 17)	
8	**Unit 7 C,D.**p.58-61 **Unit 8 A.**p. 62-63 **Unit 8 B p. 64-65**	• **Social Networking.** Vocabulary and Speaking. *The lonely generation?* Listening CD2-22 **Real world** exercises. Video 7 • **Angry planet** Vocabulary and Speaking. Exercises 1, 2. Reading *Natural Disasters.* **Recycle!** Vocabulary *Countries.* Speaking and Listening CD2-31 Writing organizing a letter/ e mail; connecting words, the passive	Midterm
9	**Unit 8 C,D.** p. 66- 69 **Unit 9 A.B** p. 70-71	• **Dangers at sea, hiking trip** Speaking and Listening CD2- 34, Reading, Vocabulary and Speaking *Saving Jesse's Arm.* CD2-35. **Video 8** • **Get healthy!** Reading and Listening *Just juice* Vocabulary and Speaking. CD2-39. **Good news, bad news.** Speaking and Vocabulary. Listening CD2-40. Listening and Speaking	
10	**Unit 9 C,D p. 74-77**	• **Human behavior. At the doctor's.** Voca**bulary and Speaking.** *Body movements and responses.* Reading. • **Why…..?**Speaking and Listening. CD2- 44, CD2- 47, CD2- 48 **Video 9**	

11	**Unit 10 A p. 78,79** **Unit 10 B p. 80- 81**	• **The anniversary.** Vocabulary and Speaking. *Contacting people.* Speaking and Listening. CD3-1 • **Who's that?** Vocabulary and Speaking. *Describing and Speaking.* Listening CD3- 3, CD3- 5	
12	**Unit 10 C, D** p. 82-85 **Unit 11 A p. 86-87**	• **I do! Do you mind?** Reading and Vocabulary *For better, for Worse* **CD3- 8 , CD3- 9 Video 10** • **Any messages? Vocabulary and Speaking. Listening Cd3-13**	
13	**Unit 11 B p. 88-89** **Unit 11 Cp. 82-83**	• **How did it go?** Vocabulary and Speaking. Exercise 1a. Speaking and Listening CD3 17, 18. *What not to ask in an interview! CD3-20* • **Undercover.** Speaking, Reading and Vocabulary. *Under cover's success is not secret.* Listening and Speaking.	
14	**Unit 12 A, B** **Unit 12 C,D**	• **It's my first day** CD3-22. Exercises 2a,b,c **I wish**! Vocabulary and Speaking. Listening CD3- 29,30 • **Important moments** Vocabulary and Speaking *Phrases with **get*** Listening CD3- 31 • **Superheroes.** Speaking and Listening CD3- 35 *The Real Spider Man*	
15			Final

Recommended Sources

TEXTBOOK(S)

3. Chris Redston and Gillie Cunningham: Face2face. Pre-intermediate: Second Edition. Students' Book and Workbook. Cambridge University. 2013.
4. English Vocabulary in use. Pre-intermediate-Intermediate. Stuart Redman. 2017.

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written-Oral Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- In order for you (and your classmates) to be successful in this course, you must submit all of your work on time. This is especially important because so much of your grade depends on giving feedback and revising based on the feedback you receive.
- Drafts for peer review and peer review letters cannot be submitted after the class period they are due (i.e. they receive a zero), unless you've made arrangements with the lecturer.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industry University General Student Discipline Regulations.

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	10	10
Tutorials	14	2	28
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**163**
Total Workload/30(h)			**≈ 5.43**
ECTS Credit of the Course			**5**

Course Unit Title	Calculus II
Course Unit Code	MATH 1201
Type of Course Unit	Compulsory
Level of Course Unit	1st year of OGEN program
National Credits	0
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Ph.D. Azimova G.M.
Name of Lecturer (s)	Ph.D. Azimova G.M.
Name of Assistant (s)	
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	MATH 1101 Calculus I
Recommended Optional Programme Components	-

Course description:

In this course, the basic classical methods of mathematics, necessary for future engineers, are given. This course includes the following chapters of "Calculus II":

1. Definite Integral. Applications of Definite Integral.

2. Differential calculus of functions of several variable and its applications

3. Numerical Series. Alternating series. Functional Series. Taylor and Maclaurin Series.

This course provides students possibility to achieve high level of mathematical knowledge.

Objectives of the Course:

The teaching students of backgrounds of Calculus needed for future chemical engineers. Students must know the basic principles of mathematics should be able to apply them. Studying mathematics requires the student to try solving problems using the knowledge they have gained.

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Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Apply the limits, continuity, derivative and integral concepts related with the multi-variable functions.	1,2,3,4
2	Calculate the maximum and minimum values of multi-variable functions	1,2,3,4

3	Calculate the areas bounded by the curves, the volumes and the lateral areas of rotating bodies by using the integrals.	1,2,4

Assessment Methods: 1. Final Exam, 2. Independent works, 3.Midterm, 4. Seminars, 5. Quizzes

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	4
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	3
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	5
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4
7	Constant and continuous self-development and learning for a long time.	1
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	3
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	2

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Sums and Sigma Notation. Areas as Limits of Sums. The Definite Integral.	
2	[1]	Basic Properties of a Definite Integral. The Newton-Leibniz Theorem. Methods of evaluating definite integral.	
3	[1], [2]	Applications of Definite Integral. Arc Length. Areas of Surfaces of Revolution	
4	[1], [2]	Volumes Using Cross-Sections .Volumes Using Cylindrical Shells	
5	[1], [2]	Improper Integrals. Improper integrals with infinite limits. Improper integrals of unbounded functions	
6	[1], [2]	Functions of two variables. Limit of a function of two variables. Continuity	
7	[1], [2]	Partial derivatives. Differentials. Total differential	
8	[2]	Directional Derivative. Gradient.	Midterm

9	[2]	Derivatives and differentials of higher orders. Extrema of function of two variables	
10	[2]	Numerical Series. Properties of Convergent Series. Necessary Condition for Convergence of a Series. Comparison Tests for Positive series. D'Alembert's Test. Cauchy' Root Test.	
11	[1], [2]	Alternating series. Absolute and conditional convergence. Leibniz' test.	
12	[1], [2]	Functional Series. Weierstrass' test. Power Series. Abel's theorem.	
13	[1], [2]	Taylor and Maclaurin Series. Applications of Taylor and Maclaurin Series.	
14	[1], [2]	Parametric Equations and Polar Coordinates	
15			Final

Recommended Sources

TEXTBOOK(S) 1. Calculus. Early Transcendentals. Calculus. McMaster University and University of Toronto. Printed in USA, 2014.

2. Thomas`Calculus. George B. Thomas. Massachusetts Institute of Technology.2004

3. Calculus. Ron Larson. Bruce Edwards ,2014

4. A.F. Bermant, I.G.Aramanovich. Mathematical Analysis. Moscow. 2005

Assessment		
Attendance		Less than 25% class attendance results in NA grade
Independent works	20%	
Seminars (Quizzes)		
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of University Guidelines for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students can use calculators during the exam.

- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	12	12
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	1	7	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**165**
Total Workload/30(h)			**≈ 5.5**
ECTS Credit of the Course			**6**

Course Unit Title	General Chemistry II
Course Unit Code	CHEM 1201
Type of Course Unit	Compulsory
Level of Course Unit	1st year OGEN program
National Credits	0
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	0
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Professor Minira M. Aghahuseynova
Name of Lecturer (s)	Professor Minira M. Aghahuseynova
Name of Assistant (s)	Professor Minira M. Aghahuseynova
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	CHEM 1101
Recommended Optional Programme Components	-

Course description:

Chemical Kinetics. Le Chatelier's principle on chemical equilibrium. Disperse systems. Classification of solutions. Solubility. Methods of expressing the concentration of solutions. Solutions of electrolytes. Strong and weak electrolytes, the degree and the dissociation constant hydrogen index. Reactions in solutions of electrolytes. Ionic exchange reactions. Hydrolysis of salts. The modern theory of acids and basis. Oxidation-reduction reactions and factors affecting their direction. Electrolysis of melts and solutions. Laws of electrolysis. General properties of metals. Obtaining metals from ores. Corrosion of metals and method of protection.

Objectives of the Course:

The aim of the subject is formation of real comprehension of the world- scientific view of contemporary theories based on interrelation of nature laws and phenomena, systematization and deepening of students' knowledge in the field of chemistry. The main goal of the subject in the process of training is to master theoretical and practical basis of chemistry for its application in solution of various ecological problems, analysis of water, seil, air and in chemical technology industry.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Decribe chemical kinetics. Define reaction rate.	1,
2	Calculate halflife and concentration for the first and second order reactions.	1,2,4,3
3	Express chemical equilibrium. Define equilibrium constant.	1,3
4	Express importance of Le Chatelier's principle on chemical equilibrium	1,3,4
5	List basics and acids Electrochemistry. Write redox reactions.	1,3
6	Ability write electrolysis solutions of salts.	1,3

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Lab. Work, 4. Quizzes		
Course's Contribution to Program		
		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	5
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	4
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	4
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	3
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	3
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	2
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Chemical kinetics	
2	[1], [2]	Catalysis and catalysts	
3	[1], [2]	Chemical equilibrium. Acid and bases in aqueous solution:pH	
4	[1]	Dispers systems. Solutions	
5	[1]	Physical properties of solutions.	
6	[1]	Solutions of electrolytes	
7	[1], [2]	Hydrolysis of salts.	
8	[1], [2]	Acids, base and acid-base Theory	Midterm
9	[1], [2]	Electrochemistry	
10	[1], [2]	Redox reactions	
11	[1], [2]	Electrolysis and Faradey's Laws	
12	[1], [2]	Nuclear chemistry	
13	[1], [2]	Common properties of metals. Industrial production of metals.	
14	[1], [2]	Corrosion of metals.	
15			Final

Recommended Sources

TEXTBOOK(S)

1. William L. Masterton, Cecile N. Hurley, Edward J. Neth. Chemistry: Principles and reactions, Belmont, CA Brooks/Cole, Cengage Learning 2012, p.774
2. Thomas R. Gilbert, Rein V. Kirss, Natalie Foster, Stacey Lowery Bretz, Chemistry.An Atoms-Focused Approach (Second Edition) W.W.Norton@Company, London, 2018.p.1256 .
3. Catherine E.Housecroft, Edüin C.Constable, Chemistry, Prentice Hall, Upper Saddle River, United States, 2005, p.1316.

Assessment

Attendance		Less than 25% class attendance results in NA grade
Presentation	20%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students cannot use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	1	7	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.57**

ECTS Credit of the Course	**6**

Course Unit Title	General Chemistry Laboratory II
Course Unit Code	LAB 1201
Type of Course Unit	Compulsory
Level of Course Unit	1st year OGEN program
National Credits	0
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	0
Practice (hour/week)	0
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	1
Course Coordinator	Professor Minira M. Aghahuseynova
Name of Lecturer (s)	Professor Minira M. Aghahuseynova
Name of Assistant (s)	Professor Minira M. Aghahuseynova
Mode of Delivery	Laboratory
Language of Instruction	English
Prerequisites	CHEM 1201
Recommended Optional Programme Components	-

Course description:

Historical development of chemistry science. Matter and measurements. Classification of inorganic compounds. Electronic structure of atom and molecule. Atomic properties and Periodic table. The main Laws of chemistry. Bonding Theory. Hybridization of AO. Classification and nomenclature of complex compounds. Bases of Thermodynamics.

Objectives of the Course:

The aim of the subject is formation of real comprehension of the world- scientific view of contemporary theories based on interrelation of nature laws and phenomena, systematization and deepening of students' knowledge in the field of chemistry. The main goal of the subject in the process of training is to master theoretical and practical basis of chemistry for its application in solution of various ecological problems, analysis of water, seil, air and in chemical technology industry.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Recognise the laboratory environment. Name laboratory equipments. Describe how they securily/safely work with these equiments	1
2	Express theoretical knowledge of chemistry with experimental methods.	1,4
3	Express reaction products in terms of stoichiometric relations.	1,3,4
4	Interpret and report results of experiments.	3,4
5	Collect and report datas of experiments. Report results in a proper format.	1,3

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Lab.work, 4. Quizzes

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	5
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	4
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	4
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	3
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	3
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	2

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1		Heat effect of chemical reactions.	
2		The rate of chemical reaction.	
3		Factors affecting. Reaction rates	
4		Chemical equilibrium	
5		State of matter and Intermolecular forces	
6		Preparing solutions and defining their concentration.	
7		Water analysis. Solids.	
8		Electrolytic dissociation, hydrogen indicator.	Midterm
9		Ionic exchange reactions.	
10		Hydrolysis of salts.	
11		Oxidation-reduction reactions.	
12		Influence of medium on direction of redox reactions.	
13		Electrolysis.	
14		Common properties of metals. Corrosion of metals.	
15			Final

Recommended Sources

TEXTBOOK(S)

1. No materials needed. Labs posted on Blackboard

Assessment

Attendance		Less than 25% class attendance results in NA grade
Presentation	10%	
Laboratories	15%	
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University for Undergraduate Studies.

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students cannot use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	2	28
Presentation	1	10	10
Tutorials	14	1	14
Self-study	14	3	42
Midterm Examinations	1	3	3
Preparation for midterm exams	1	7	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**121**
Total Workload/30(h)			**≈ 4.03**
ECTS Credit of the Course			**4**

Course Unit Title	General Physics
Course Unit Code	PHYS 1201
Type of Course Unit	Compulsory
Level of Course Unit	1-st year BSc program
National Credits	5
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	1
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Prof. Jeyhun Naziyev
Name of Lecturer (s)	Prof. Jeyhun Naziyev
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	Elementary algebra and trigonometry will be used. No prior knowledge of physics is assumed.
Recommended Optional Program Components	Pre Intermediate English level grammar, reading, writing and listening skills.

Course description:

Physics is a science that studies the simplest and at the same time the most general laws of the phenomena of nature, the properties and structure of matter and the laws of its motion. Physical theory is a system of basic ideas that generalize experimental data and reflect the objective laws of nature. Physical theory provides an explanation for a whole range of phenomena of nature from a single point of view. Physics has a huge impact on technology. General Physics course topics covered will include: classical physics and the laws of motion, molecular physics and thermodynamics, electricity and magnetism, wave and quantum optics, elements of quantum mechanics, atomic nucleus composition and other stuff.

Objectives of the Course:

- **A general physics course which includes material from Newtonian Mechanics, molecular physics and thermodynamics, electromagnetism, optics, and modern physics. Lectures include basic principles/concepts illustrated with examples. Students are expected to attend lectures, and spend time reading the textbook and solving problems from the textbook to develop a strong understanding of the physical principles. Students cannot pass the course without passing the lab. The purpose of the physics laboratories is to help students visualize some of the concepts covered in class, to give students hands on experience with equipment and techniques of taking and analyzing data and to help students develop critical thinking skills.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	To understand translational and circular motions and calculate displacement, velocity, acceleration, momentum and force using equations from kinematics and dynamics.	1,2,3,4,5
2	To describe work-energy theorem and conservation laws.	1,2,3,4
3	To describe simple harmonic, damped and forced vibrations and calculate amplitude, frequency and period.	1,2,3,4
4	To understand gas laws and kinetic theory of gases and calculate some properties using equations of state for ideal and real gases.	1,2,3,4,5
5	To describe the laws of thermodynamics and ideal heat engine cycle.	1,2,3,4
6	To describe and calculate electric fields, electric forces, and electric potentials due to point charges, continuous distributions of charge and charged conductors using Coulomb's Law and Gauss's Law.	1,2,3,4
7	To understand the electrical properties of resistors and capacitors and determine properties of direct current circuits containing them.	1,2,3,4,5

8	To understand the sources of magnetic fields. To calculate magnetic field from moving charges using Ampere's Law.	1,2,3,4
9	To understand the concepts of induction and calculate induced emf using Lenz's Law.	1,2,3,4
10	To describe the nature of light and other electromagnetic waves using concepts such as reflection, refraction, dispersion, diffraction, and interference.	1,2,3,4,5
11	To understand wave-particle duality and its consequences in areas such as the blackbody radiation, the photoelectric effect, and atomic spectra.	1,2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Presentation, 5. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	3
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	5
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2] 1,2,3,5	The subject of physics. Kinematics of translational and rotational motion.	
2	[1], [2] 4,6,7,8	Dynamics of translational and rotational motion. Linear momentum. Law of conservation of linear momentum. Work, energy and power. Law of energy conservation. The law of conservation of angular momentum.	
3	[1], [2] 11	Harmonic oscillations. Addition of harmonic oscillations. Damped and forced oscillations. Wave process.	
4	[1], [2] 13	The main principles of the molecular-kinetic theory of an ideal. Number of degrees of freedom of a molecule. Internal energy and heat capacity of an ideal gas.	
5	[1], [2] 13	Maxwell's velocity distribution in gases. Barometric formula. Boltzmann distribution. The mean free path.	
6	[1], [2] 14,15	Laws of Thermodynamics. Heat Engines. Thermal efficiency. Carnot cycle. Entropy.	
7	[1], [2] 16, 17	Electrostatics. The electric field and its characteristics. Dielectrics. Conductors.	
8	[1], [2] 18	Electrodynamics. Direct electric current. Electromotive Force. Resistors in Series and Parallel. Kirchhoff's Rules.	Midterm
9	[1], [2] 20	A magnetic field . The Biot-Savart-Laplace law and its applications. The effect of the magnetic field on conductors with current and moving charged particles. The law of total current. The magnetic field of the solenoid.	
10	[1], [2] 19, 21	Electromagnetic induction. Faraday's law. The phenomenon of self-induction. Alternating current.	
11	[1], [2] 24	Wave optics. Interference and diffraction of light. Polarization of light. The law of Malus.	

12	[1], [2] 27	Thermal radiation laws. Quantum optics. Photoelectric effect.	
13	[1], [2] 28	Physics of atom. Model of the Rutherford atom. The postulates of Bohr. Spectra of hydrogen-like atoms. Elements of quantum mechanics: Hypothesis of de Broglie. The Heisenberg uncertainty relation.	
14	[1], [2] 30	Natural radioactivity. Composition of the atomic nucleus.	
15			Final

Recommended Sources

1. **Physics: Principles with Applications. Douglas C. Giancoli. 7th edition. 2014**
2. **Physics for Scientists and Engineers with Modern Physics. Raymond A. Serway, John W. Jewett. 9th edition. 2014**
3. **Laboratories on physics. ASOIU. 2018**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	13	13
Tutorials	14	1	14
Self-study	14	4	64
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**160**
Total Workload/30(h)			**≈ 5.3**
ECTS Credit of the Course			**5**

Course Unit Title	Statics & Mechanics
Course Unit Code	TECH 1201
Type of Course Unit	Compulsory
Level of Course Unit	1st year BSc program
National Credits	4
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Ass. Yusif Orujov
Name of Lecturer (s)	Ass. Yusif Orujov
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	Pre Intermediate English level grammar, reading, writing and listening skills.

Course description:

The science, which treats of the general laws of motion and equilibrium of material bodies, also behavior of bodies from the action of forces is called Mechanics. Statics studies the forces and the conditions of equilibrium of material bodies subjected to the action of forces.
Strength of materials - the science of engineering methods for calculating the strength, rigidity and stability of elements of structures and machine parts.

Objectives of the Course:

To determine the stresses, strains, and displacements in structures and their components due to the loads acting on them.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Consider of the common laws of motion and equilibrium of material bodies.	1
2	Consider behavior of bodies from the action of forces.	1, 2, 3
3	Applied of engineering methods for calculating the strength, rigidity and stability of elements of structures and machine parts.	2, 3, 4

Assessment Methods: : 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation,

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3

2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Basic Concepts and Principles of Statics. Force Axioms of Statics	
2	[1], [2]	The projection of force on the axis and on the plane Geometric method of adding forces	
3	[1], [2]	Equilibrium convergent forces. The moment of force relative to the center (or point)	
4	[1], [2]	Varignon's theorem on the moment of resultant A pair of forces. The moment of the pair	
5	[1], [2]	The reduction of the plane force system to this center Conditions for the equilibrium of an arbitrary plane system of forces	
6	[1], [2]	Real object and scheme of calculation. External and internal forces. Section method.Stresses.	
7	[1], [2]	Displacements and deformations Assumptions used in the resistance of materials .Mechanical Properties of Materials Poisson’s Ratio	
8	[1], [2]	General principles calculation of construct Longitudinal forces in cross sections .Stress in the cross sections of the rod .Deformation and displacement. Hooke's Law	Midterm
9	[1], [2]	Stressed and deformed state under tension and compression. Calculation of statically determined rod systems	
10	[1], [2]	Geometrical characteristics of flat sections. Area of flat sections. Static moments of a section.Moments of inertia of flat sections of simple shape	
11	[1], [2]	Stresses in cross-section in torsion.The condition of strength a circular and an annular section of shaft in torsion . The torsional deformations and the rigidity condition of the shaft.	
12	[1], [2]	The construction of the transverse force and bending moment diagrams.	

13	[1], [2]	Basic differential relations of the theory of bending .Stress in pure bending	
14	[1], [2]	Tangential stresses in transverse bending. Displacements in the bending of beams	
15			Final

Recommended Sources

TEXTBOOK(S)

1. **Rajput R.K. Strength of materials.-2019,**
2. **Strength of Materials (Mechanics of Solids) E Book by R.S.Khurmi 2019**
3. **James M.Gere , Rarry J. Goodno -2011, 618 p**

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Seminars	0%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written-Oral Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University Guidelines for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students cannot use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	5	5
Tutorials	10	1	10
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	1	3	3
Final Examination	1	3	3
Preparation for final exam	1	10	10
Total Workload			**132**
Total Workload/30(h)			**≈ 4.4**

ECTS Credit of the Course	**4**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Exposition and argumentation
Course Unit Code	EXP 2101
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	-
Practice (hour/week)	3
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	
Name of Lecturer (s)	Aygun Khalilova
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	

Course description:

English2101 is an exposition and argumentative writing course consisting of 42 hours. It provides profound knowledge on how to understand and classify academic writing materials. Based on different sources the students are taught to analyze academic writing materials and to create their own examples. Exposition and Argumentation provides students with the rhetorical foundations that prepare them for the demands of academic writing. In general, students will be working with sources of various kinds to make claims about issues that are up for debate and to design texts that will appeal to readers. Additionally, this course examines and practices academic conventions of word usage, sentence structure and variation, and paragraph formation.

Objectives of the Course:

EXP 2101 is aimed to:

- To understand academic texts;
- To equip the students with critical analysis abilities about the text;
- To choose the right structure to create their own texts;
- To provide them with skills to analyze all information received from different sources and synthesize it in their own writings;
- Build written invention strategies, such as observing, brainstorming, associating, drafting;
- Practice a variety of revision and editing techniques for written content, structure and style;
- Create direct grammatically correct sentences;
- Write for varied purposes informing, analyzing, and arguing;

- Demonstrating a clear and effective writing style, write coherent, cohesive, and clear paragraphs;
- Plan, draft, revise, edit, and proofread essays;
- Use evidence to effectively to support argumentative claims or theses.

Learning Outcomes

	At the end of the course the student will be able to:	Assessment
1	Read, plan, draft, review, collaborate, revise, rewrite, reread, edit, and proofread argumentative essays	2,4
2	Read, write, and think critically	1,4
3	Write coherent, cohesive, and clear paragraphs	1,2,4
4	Use key rhetorical concepts through analyzing and composing a variety of texts	1,2,3,4
5	Acquire writing skills using the inductive, deductive, comparison and other methods.	1,2,3,4
6	Prepare paragraphs and texts, or submit presentations on different topics	2,4
7	Use evidence and reasoning to effectively support argumentative claims or theses	1,2,3,4
8	Write an organized logical argument	1,3,4
9	Use structures, including grammar, punctuation, and spelling, through practice in composing and revising	1,3,4

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm Exams

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	1
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	2
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	2
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	2
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	2
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	2
7	Constant and continuous self-development and learning for a long time.	5
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	2

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam

1	[1], [2]	• Process Writing; Pre-writing: Getting ready to write Understanding process writing. Choosing and narrowing a topic Gathering ideas Editing ideas *(Academic Writing from Paragraph to Essay)* Countries, nationalities and languages The Weather	
	[1], [2]	• The Structure of a Paragraph The definition of a paragraph The parts of a paragraph Identifying and writing topic sentences *(Academic Writing from Paragraph to Essay)* Describing people: appearance Describing people: character	
2	[1], [2],[3]	• The Development of a Paragraph Paragraph support and development Writing concluding sentences Peer Editing *(Academic Writing from Paragraph to Essay)* Idioms describing people Relationships	
3	[1], [2]	• Descriptive and Process paragraphs Descriptive paragraphs and reasons for writing them Organising and writing descriptive paragraphs using adjectives and prepositions Process paragraphs and reasons for writing them Using transition words to write a process paragraph *(Academic Writing from Paragraph to Essay)* At Home Everyday minor problems	
	[1], [2]	• Trends and Fashions Review of descriptive vocabulary Using freewriting to brainstorm Review of paragraph contents Developing peer feedback skills Writing about a trend *(Writing in Paragraphs)* Global problems Education	
4	[1], [2]	• Opinion Paragraphs Distinguishing between fact and opinion	

		Organising and writing paragraphs expressing opinions and arguments Using transition words to express cause and effect Using modal expressions to make recommendations *(Academic Writing from Paragraph to Essay)* Work Business Sport	
5	[1], [2]	• Explanations and Excuses Paragraphs explaining cause and effect/result Combining sentences with so and because Practising word maps and freewriting Writing about explanations and excuses *(Writing in Paragraphs)* Art and Literature Theatre and Cinema Music	
	[1], [2]	• Comparison/Contrast paragraphs Comparison/contrast paragraphs and reasons for writing them Organising comparison/contrast paragraphs Connecting words used for comparing and contrasting topics *(Academic Writing from Paragraph to Essay)* Food Physical geography Environmental problems	
6	[1], [2]	• Problem/Solution paragraphs Writing about problems and solutions Using first conditionals Writing a two-paragraph text with linking phrases *(Academic Writing from Paragraph to Essay)* Towns The Natural World Clothes	
7	[1], [2]	• Problems Expressing personal feelings about problems Using would like to, want to, and have to Logical order of supporting sentences Editing lists by ordering ideas logically Writing about problems or difficulties *(Writing in Paragraphs)* Health and Medicine Medicine and Technology Health and Lifestyle	

	[1], [2]	• Strange Stories Using time expressions: after, before, and when Identifying the main parts of a narrative Ordering events in a narrative logically Writing about interesting or unusual experience *(Writing in Paragraphs)* Travel Holidays	
8	[1], [2]	• Differences Using double lists to brainstorm Using whereas and however to make comparisons Organising a comparison paragraph Comparing different situations/events Writing about life changes *(Writing in Paragraphs)* Science and Technology Computers	Midterm
9	[1], [2]	• Difficult Decisions Writing about cause and effect relationships Using pair interviews to brainstorm Beginning paragraphs with a question Writing about a difficult decision *(Writing in Paragraphs)* Communication and the Internet The Press and Media Politics and Public institutions	
	[1], [2]	• Fate or Choice Writing about hopes and plans for the future Review of brainstorming techniques Review of transition expressions Writing about the future *(Writing in Paragraphs)* Crime Money Describing objects	
10		• The Structure of an Essay The definition of an essay Formatting an essay Writing a thesis statement *(Academic Writing from Paragraph to Essay)* Belief and opinions	

11	[1], [2]	• Outlining of an Essay The purpose of an outline Writing an outline *(Academic Writing from Paragraph to Essay)* Pleasant and unpleasant feelings Like, dislike and desire	
	[1], [2]	• Introductions and Conclusions The purpose of an introduction Types of information in introductions The purpose of a conclusion Writing conclusions *(Academic Writing from Paragraph to Essay)* Speaking The six senses What your body does	
12	[1], [2]	• Unity and Coherence The importance of unity in essay writing Editing an essay for unity The importance of coherence in essay writing Creating coherence *(Academic Writing from Paragraph to Essay)* Praising and criticizing Emotions and moods	
13	[1], [2]	• Discursive Essays For and against essays Writing for and against essays *(Successful Writing Proficiency)* Commenting on problematic situations	
	[1], [2]	• Discursive Essays Opinion essays Writing opinion essays *(Successful Writing Proficiency)*	
14	[1], [2]	• Discursive Essays Essays suggesting solutions to problems Writing problem-solution essays *(Successful Writing Proficiency)*	
15			Final

Recommended Sources

TEXTBOOK(S)

1. Dorothy E.Zemach, Lisa A.Rumisek: Academic Writing from Paragraph to Essay, Macmillan Education 2011

2. Dorothy E.Zemach, Carlos Islam: Writing in Paragraphs, Macmillan Education 2011
3. Oxford Advanced Learner's Dictionary
4. Vocabulary in Use Upper-intermediate, Cambridge University Press 2012
5. Virginia Evans: Successful Writing Proficiency, Express Publishing 2000
6. Ann Hogue: First Steps in Academic Writing, 2nd Edition, Pearson Education 2008

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Midterm Exam	30%	Written-Oral Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University Guidelines for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- In order for you (and your classmates) to be successful in this course, you must submit all of your work on time. This is especially important because so much of your grade depends on giving feedback and revision based on the feedback you receive.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industry University General Student Discipline Regulations.

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Technical English I
Course Unit Code	ENG 2101
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	-
Practice (hour/week)	3
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Phd. Gullu Jabbarova
Name of Lecturer (s)	Phd. Gullu Jabbarova
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	ENG 1201
Recommended Optional Programme Components	Pre Intermediate English level grammar, reading, writing and listening skills.

Course description:
Technical English is for students who are involved in vocational and technical education. The course contains the core language and skills which are common to a range of industrial specializations.
This course aims to bring the students to a level that will enable them fulfill the requirements of main courses of their departments. Students will be encouraged to read a variety of texts as well as chapters from textbooks so that they can pursue their undergraduate studies at the university without major difficulty.
HF-BO3.1 is designed to improve the students' presentation ability. Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

- **To develop students' language skills and capacity to conduct writing task through the vocabulary, listening and speaking skills.**
- **To develop their level of knowledge, communicative capacity, and ability to analyze and reflect on the language.**
- **To give learners the language they need for real-life, hands-on task like explaining a process or analyzing risk and to put into practice the academic skills that they will need to use during their educations.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	An international industry	
2	[1], [2]	Upstream	
3	[1], [2]	Downstream	
4	[1], [2]	Safety first	
5	[1], [2]	Finding oil and gas	
6	[1], [2]	Drilling	Midterm
7	[1], [2]	Pipes and pipelines	
8	[1], [2]	Working offshore	
9	[1], [2]	Natural gas	
10	[1], [2]	Oil and the environment	
11	[1], [2]	Workshop operations	
12	[1], [2]	Repairs and maintenance	
13	[1], [2]	The refinery	
14	[1], [2]	Emergencies	
15			Final

Recommended Sources

1. **Technical English 3. Course book. Bonamy David. — Longman Pearson, 2011.**
2. **Technical English 3. Workbook. Jacques Christopher. — Longman Pearson, 2011.**
3. **Havard Devold. Oil and gas production handbook. An introduction to oil and gas production, transport, refining and petrochemical industry. ABB ATPA Oil and Gas, 2006 - 2013**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Analytic Geometry and Algebra
Course Unit Code	MATH 2101
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	28/14
Practice (hour/week)	14/7
Laboratory (hour/week)	0
Year of Study	2019-2020
Semester when the course unit is delivered	3
Course Coordinator	
Name of Lecturer (s)	Ramin Rzayev
Name of Assistant (s)	-
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisites	MATH1201
Recommended Optional Programme Components	

Course description: Analytic geometry is widely used in physics and engineering, and also in aviation, rocketry, space science, and spaceflight. It is the foundation of most modern fields of geometry, including algebraic, differential, discrete and computational geometry. Usually the Cartesian coordinate system is applied to manipulate equations for planes, straight lines, and squares, often in two and sometimes in three dimensions. Geometrically, one studies the Euclidean plane (two dimensions) and Euclidean space (three dimensions).

Objectives of the Course:

During orientation you can expect to:

- Provide engineering students with an introduction to the basic principles of general,
- Analytic geometry and algebra
- Assist in the development of strong problem-solving skills.
- Help cultivate critical thinking in the approach to learning.
- Help in the acquisition of -on practical skills at the seminar.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Understand and appropriately use the technical vocabulary of the topics covered such as vector, vector-valued function, tangent vector, space curve, tangential components, normal components, neighbourhood in the plane.	

2	Perform vector operations and interpret the results geometrically.	
3	Use vectors to solve problems involving force, velocity, work, and real-life problems.	
4	Find the angle between two vectors using the dot product.	
5	Find the direction cosines of a vector in space.	
6	Find the projection of a vector onto another vector.	
7	Find the cross product of two vectors in space.	
8	Use the triple scalar product of three vectors in space.	
9	Write a set of parametric equations for a line in space	
10	Find the distance between points, planes, and lines in space.	
11	Recognize and write equations for different surfaces.	

Assessment Methods:

Course's Contribution to Program

1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	4
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	1
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	3
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	2
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	1
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	2
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	1
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	1

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2], [4]	Vectors in the Plane	
2	[1], [2], [4]	Space Coordinates and Vectors in Space	
3	[1], [2], [4]	The Dot Product of Two Vectors	
4	[1], [2], [4]	The Cross Product of Two Vectors in Space	
5	[1], [2], [4]	Inner Product Spaces	
6	[1], [2], [4]	Spanning Sets and Linear Independence	
7	[1], [2], [4]	Basis and Dimension	
8	[1], [2], [4]	Rank of a Matrix and Systems of Linear Equations	Midterm

9	[1], [2], [4]	Coordinates and Change of Basis	
10	[1], [2], [4]	Applications of Vector Spaces	
11	[1], [2], [4]	Orthonormal Bases: Gram-Schmidt Process	
12	[1], [2], [4]	Mathematical Models and Least Squares Analysis	
13	[1], [2]	Lines and Planes in Space	
14	[1], [2]	Surfaces in Space	
15			Final

Recommended Sources

TEXTBOOK(S)

Principal:

1. Douglas Riddle. Analytic Geometry. Cengage Learning, 6th Edt., 1996.
2. Ron Larson. Elementary Linear Algebra. Cengage Learning, 8th Edt., 2016.
3. Ron Larson, Bruce Edwards. Multivariable Calculus. Brooks/Cole (Cengage Learning), 10th edition, 2014.
4. Gordon Fuller, Dalton Tarwater. Analytic Geometry. Pearson, 7th Edt. 1992.

Supplementary:

5. Richard Silverman. Modern Calculus and Analytic Geometry. Dover Books on Mathematics, 2012.
6. Vladimir Serdarushich. Analytic Geometry. CreateSpace Independent Publishing Platform, 2015.
7. George Thomas, Ross Finney. Calculus and Analytic Geometry. Addison Wesley, 9th edition, 1995.

Assessment

The independent work	20%	abstract, presentation, research, etc.
Midterm	30%	only in the writing form
Final Exam	50%	writing & oral form
Total	100%	

Assessment Criteria

Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students may use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Near East University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14

Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**170**
Total Workload/30(h)			**≈ 5.67**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Reservoir Fluid Flow
Course Unit Code	OGEN 2101
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	5
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 1101 (Introd. to Petroleum Engineering);
Recommended Optional Program Components	

Course description:

Fluid mechanics forms an essential part of the knowledge of petroleum engineers. Its applications can be found in almost every area of petroleum engineering including drilling, well completing, production technology, transportation and refining. The design methods and everyday practice of these special fields apply their own application-oriented hydraulics. These independently developed branches of applied fluid mechanics are often not very well integrated. There seems to be a need to treat these individual sections together within the general framework of continuum mechanics. In addition, the elegance and logical structure of this theory may influence the way of thinking of petroleum engineers.

The main purpose of this course to provide the petroleum engineer with a systematic analytical approach to the solution of fluid flow problems.

Objectives of the Course:

Basic concepts of origin, accumulation and recovery of hydrocarbon fluids.
Fluid properties
Reservoir rock properties and core analysis procedures, porosity-permeability relationships.
Darcy's law for linear and radial flow, steady-state and pseudo steady-state flow.
Wellbore damage, skin-factor and well productivity.
Wettability, capillary pressure and vertical distribution of reservoir fluids.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction. The porous medium. Homogeneity. Anisotropy.	
2	[1]	Porosity	
3	[1]	Pore size distribution	
4	[1], [2]	Specific surface area. Compressibility of porous rocks	
5	[1]	Permeability	
6	[1], [2]	Saturation. Formation resistivity factor	
7	[1], [2]	Multi-phase saturated rock properties	
8	[1]	Relative permeability	Midterm
9	[1], [2]	Fick's law of binary diffusion	
10	[1], [2]	Diffusion coefficient	
11	[1], [2]	Equations of single-phase filtration	
12	[1], [2]	Solutions of the single-phase equation of filtration	
13	[1], [2]	Two-phase filtration.	
14	[1], [2]	Immiscible displacement	
15			Final

Recommended Sources

1. **Craft B.C., Hawkins M.F. Applied petroleum reservoir engineering. Massachusetts. Second printing, July 2015.**
2. **Tarek Ahmed. Reservoir engineering handbook. 2010 ELSEVIER Inc.**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**153**
Total Workload/30(h)			**≈ 5.1**
ECTS Credit of the Course			**5**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Reservoir Fluid Flow Laboratory
Course Unit Code	LAB 2101
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	2
Number of ECTS Credits Allocated	2
Theoretical (hour/week)	-
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	2
Semester when the course unit is delivered	3
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 2101
Recommended Optional Program Components	

Course description:

Knowledge of petrophysical and hydrodynamic properties of reservoir rocks are of fundamental importance to the petroleum engineer. These data are obtained from two major sources: core analysis and well logging. In this course we present some details about the analysis of cores and review the nature and quality of the information that can be deduced from cores.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

By the end of the course the students should be able to learn :

Reservoir Fluid Properties
Fundamentals of rock properties
Relative permeability
Drainage process
Imbibitions process
Fundamentals of Reservoir Fluid Flow
Water and Gas Coning
Water Influx
Water and Gas injection

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Fundamentals of reservoir and reservoir fluids	1
2	Reservoir-fluid properties	1, 2, 6
3	Fundamentals of rock properties:	2,3,4, 6
4	Relative permeability concepts.	1, 2, 6
5	Fundamentals of reservoir fluid flow	2, 3, 6
6	Principles of waterflooding	2,3,4,6

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Prepare core sample	
2	[1]	Extraction	
3	[1]	Sieve analysis of sands and plotting granulometric composition graph	
4	[1], [2]	Determination of apparent rock density	
5	[1], [2]	Determination of true rock density	
6	[1], [2]	Determination of the absolute porosity of rocks	
7	[1], [2]	Determination of the coefficient of open rock porosity	
8	[1], [2]	Determination of rock permeability	Midterm
9	[1], [2]	Determination of structural and mechanical properties of oil	
10	[1], [2]	Quantitative water content in oil	
11	[1], [2]	Work on a viscometer of the “Rheotest” type	
12	[2]	Select Parameters & Model Preparation	
13	[2]	Evaluate Lithology, Porosity, Hydrocarbon Effect and Clay Parameters by Cross plots	
14	[2]	Determination of Resistivity of water (Rw) by using Porosity-Resistivity plot (Hingle plot)	
15			Final

Recommended Sources

1. **Formation Evaluation. Heriot-Watt Institute of Petroleum Engineering. — Edinburgh, 2013. — 258p.**
1. **Darling Toby. Well Logging and Formation Evaluation. Elsevier, 2005. — 336 p..**
2. **Schön Jürgen. Basic Well Logging and Formation Evaluation. Bookboon, 2015. — 179 p.**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	2	28
Presentation	1	5	5
Tutorials	8	1	8
Self-study	14	3	42
Midterm Examinations	1	3	3
Preparation for midterm exams	5	5	5
Final Examination	1	3	3
Preparation for final exam	9	1	9
Total Workload			**103**
Total Workload/30(h)			**≈ 3.43**
ECTS Credit of the Course			**3**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	History of Azerbaijan
Course Unit Code	HIST 5001
Type of Course Unit	Elective
Level of Course Unit	2nd year OGEN program
National Credits	0
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	0
Year of Study	
Semester when the course unit is delivered	
Course Coordinator	Ms. Tahir R. JAFIYEV
Name of Lecturer (s)	Ms. Tahir R. JAFIYEV
Name of Assistant (s)	-
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

This course will cover History of Azerbaijan since ancient periods till nowadays, focusing on political, economic, military, agrarian, etnic, demografic processes which happened in the history of Azerbaijan nation.

Objectives of the Course:

The course is intended to instill a sense of patriotism, to expand and deepen students' knowledge of the history and historical analysis as well as provide them with the ability to critically read the sophisticated literature of the discipline and understand . We will focus on acquiring by them the skills of objective assessment of historical issues. The main objective of the course is delivering to students problems:

- of formation of Azerbaijan nation
- historical stages of statehood of Azerbaijan
- nowadays socio-political, economical prosperity of Azerbaijan

Learning Outcomes

At the end of the course the student will be able to	Assessment

1	Understand the historical processes on History of Azerbaijan happened from ancient period to nowadays theoretically	1,2,3
2	Critically analyze and evaluate the historical processes in given definit period of history	2
3	Critically analyze and evaluate the historical processes in Ancient and Middle Ages	3
4	Read historical literature	1,2,3

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm exam

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	2
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	2
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	3
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	4
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	3
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	3
7	Constant and continuous self-development and learning for a long time.	1
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	4
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	1,2,3,4. p.13- 61	Ancient Azerbaijan Theoretical, methodological issues and sources of Azerbaijan history. Prehistoric period in the territory of Azerbaijan. Tribal units and initial state formations in the territory of Azerbaijan. Ancient states in the territory of Azerbaijan.Mannea.Azerbaijan as part of the Median and Achamanid Empire. The state of Atropatena. Ancient Albania.	
2	5,6. p.62-138	Azerbaijan in the 3rd - in the 9th centuries Azerbaijan in the early middle ages, as part of the Sassanian Empire. Early feudalism relations in Azerbaijan, occupation of Azerbaijan by Sassanids, culture and religion. Spreading of Christianity in Albania. Azerbaijan as part of Arabic Caliphate. spread of Islam. Arab-Khazar wars. Resettlement and tax policy. Administration. Explanation of Khurramid's movement.	
	1,2,3,4. p.13- 61	**Seminar topic**: Ancient Azerbaijan Theoretical, methodological issues and sources of Azerbaijan history. Prehistoric period in the territory of Azerbaijan. Tribal units and initial state	

		formations in the territory of Azerbaijan. Ancient states in the territory of Azerbaijan.Mannea.Azerbaijan as part of the Median and Achamanid Empire. The state of Atropatena. Ancient Albania.	
3	7,8. p.139-181	Azerbaijan in Renascence epoch (the 9th - in the early of the 13th centuries) The formation of Azerbaijan nation. Feudal States of Azerbaijan in IX-first half of XI centuries. Independent feudal states - Shirvanshahs, Sajjids, Salarids, Shaddadids, Ravvadids. The Seljug Empire. The State of Atabegs.Azerbaijan in the period of developed feudalism.	
4	9,10,11. p.182-235	Azerbaijan in 13th-15th centuries Mongol rule in Azerbaijan. Timurid State. Shirvanshahs State in XIV-XV centuries. Feudal states of Azerbaijan in the XV century. The states of Jalairi, Karakoyunlu and Aghgoyunlu, Shirvanshahs.	
	7,8. p.139-181	**Seminar topic**: Azerbaijan in Renascence epoch (the 9th - in the early of the 13th centuries) The formation of Azerbaijan nation. Feudal States of Azerbaijan in IX-first half of XI centuries. Independent feudal states - Shirvanshahs, Sajjids, Salarids, Shaddadids, Ravvadids. The Seljug Empire. The State of Atabegs.Azerbaijan in the period of developed feudalism.	
5	12,13,14. p.252-325	Azerbaijan Safavid State (16th-17th centuries) Establishment of Safavids state. İnternal and foreign policy of Shah İsmail I. The reign period of Shah Tahmasib I. Safavids-Ottoman wars and Azerbaijan. Socio-economic life of Azerbaijan in XVI century. Fight for liberation against the Ottoman. The reign of Shah Abbas I and his reforms. Ottoman-Safavids wars in the first half of XVII century. Istanbul II (Sarab) and Marand, Gasry-Shirin treaties.	
6	15. p.334-344	Azerbaijan in the first half of 18th century The social-political situation in Azerbaijan after signing of Gasri-Shirin treaty (1639). Popular uprising against Safavid rule or its policies. Dividing the territory of Azerbaijan between Russia, Ottoman Empire and Safavid. Becoming of Nadir khan the main figure of these processes. Afshar as one of the Turkic tribes. Nadir's personality and his coming to the throne. His victories, raids, establishing of Empire. The political situation after his assassination.	
	12,13,14, 15. p.252-325 p.334-344	**Seminar topic**: Azerbaijan Safavid State (16th-18th centuries) Establishment of Safavids state. İnternal and foreign policy of Shah İsmail I. The reign period of Shah Tahmasib I. Safavids-Ottoman wars and Azerbaijan. Socio-economic life of Azerbaijan in XVI century. Fight for liberation against the Ottoman. The reign of Shah Abbas I and his reforms. Ottoman-Safavids wars in the first half of XVII century. Istanbul II (Sarab) and Marand, Gasry-Shirin treaties. The social-political situation in Azerbaijan after signing of Gasri-Shirin treaty (1639). Popular uprising against Safavid rule or its policies. Dividing the territory of Azerbaijan between Russia, Ottoman Empire and Safavid. Becoming of Nadir khan the main figure of these processes. Afshar as one of the Turkic tribes. Nadir's personality and his coming to the throne.	
7	16. p. 345-382	The Azerbaijani khanates The khanates of Northern Azerbaijan. Foreign policy. Socio-economy life in this period. Foreign states aspirations to establish their dominion in the Caucasus. Aga Mahammad Shah Gacar's attacks.	
8	17,18. p.383-404	Azerbaijan in 19th century Division of Azerbaijan territories between Russia and Iran. Treaty of Gulistan (1813). The second Russian-Iran war. Turkmenchay Treaty (1828). Resettlement policy. Northern Azerbaijan in 30-50th years of XIX century. Forming of military-curfew regime. Uprisings against this governance system and liquidation of it. Reforms of 40-60th years. Formation of capitalist relations. Peasantry reform of 1870.Oil industry.Culture.	Midterm
9	17,18.	**Seminar topic**: Azerbaijan in 19th century Division of Azerbaijan territories between Russia and Iran. Treaty of Gulistan (1813). The second Russian-Iran war. Turkmenchay Treaty (1828).	

	p.383-404	Resettlement policy. Northern Azerbaijan in 30-50th years of XIX century. Forming of military-curfew regime. Uprisings against this governance system and liquidation of it. Reforms of 40-60th years. Formation of capitalist relations. Peasantry reform of 1870.Oil industry. Development of oil monopolies.Culture.	
	19,20. p.405-421	Azerbaijan in the first decades of 20th century Impact of I Russian revolution(1905-1907) to the political process in Azerbaijan. Sosial-democratic organization "Hummet". Activity of Azerbaijan intelligency on formation of national consciousness. Armenian-Muslim slaughter in 1905-1906. National parties as "Difai", "Ittifag-ul-Muslimin", "Mudafia", "Musavat". All-Russian Congresses. Participation of deputies from Azerbaijan in State Dumas of Russian Empire. Azerbaijan in the interests of world countries during WW I. Heroes of war. Tendency of democratization after the February revolution (1917). Activities of Transcaucasian Comissariat and Seym. Baku Soviet attempts on weakening the social base of Musavat party. Replacing the idea of territorial autonomy by the idea of Independence.	
10	21. p.422-431	The Azerbaijan Democratic Republic Proclamation of the ADR. The state construction and foreign policy of ADR. Invasion of XI Red army.	
11	21. p.422-431	**Seminar topic**: The Azerbaijan Democratic Republic Proclamation of the ADR. The state construction and foreign policy of ADR. Invasion of XI Red army.	
	22. p.432 - 450	Azerbaijan in the 20s and 30s of the 20th century The Soviet state construction in Northern Azerbaijan. The political groups and discrepancy in the leadership of Azerbaijan. The formation of MKAO (Mountainous or Nagorno Karabakh Autonomous Oblast) and Nakhichevan ASSR (Autonomous Soviet Socialist Republic). Soviet National Policy in Azerbaijan, bloody repressions of 30s years. Policy of industrialization and collectivization. Religion and cultural revolution	
12	23. p.451 - 461	Azerbaijan during World War II (1939-1945) Participation of Northern Azerbaijan in World War II, science and culture. Formation of national divisions, population of the Az.SSR at the battle and home fronts, role of Baku oil. S.C.Pishavari. National government and its reforms. Tabriz State University. Clash of foreign interests in Iran. Suppression of National Liberation Movement of Southern Azerbaijan. Political immigrants from S.Azerbaijan.	
13	23. p.451 - 461	**Seminar topic**: Azerbaijan during World War II (1939-1945) Participation of Northern Azerbaijan in World War II, science and culture. Formation of national divisions, population of the Az.SSR at the battle and home fronts, role of Baku oil. S.C.Pishavari. National government and its reforms. Tabriz State University. Clash of foreign interests in Iran. Suppression of National Liberation Movement of Southern Azerbaijan. Political immigrants from S.Azerbaijan.	
	24. p.462-470	Azerbaijan in the years after World War II. Socio-economic development and political conditions in Northern Azerbaijan (1946-1991) Socio-economic development and political conditions in Northern Azerbaijan. New industrial cities, strengthening of strong political situation, deportation of Western azerbaijanis from their homeland by Soviet leadership in 40-50s years XX century. The leadership of 1954-1959 years in Azerbaijan (Imam Mustafayev, Sadiq Rahimov, Mirza Ibrahimov). Vali Akhundov (1959-1969) and Haydar Aliyev as the first secretary of Central Committee of Azerbaijan Communist Party (1969-1982).	
14	25. p.471-503	The Independent Azerbaijan Republic Sounding ideas of independence from Freedom Square. Black January. The Constitutional Act of the 18th October of 1991, legal-democratic state building, about reforms, struggle for the strengthening of Independence of the	

		Republic of Azerbaijan, successful relations with foreign countries.Oil strategy.	
15			Final

Recommended Sources

TEXTBOOK(S)

1.Ismail bey Zardabli. The history of Azerbaijan. (from ancient times to the present day), London, 2014.

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Seminars	0%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written-Oral Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University Guidelines for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students cannot use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	**14**	**3**	**42**
Presentation	1	5	5
Tutorials	10	1	10
Self-study	14	4	56
Midterm Examination	1	3	3
Preparation for midterm exam	3	1	3
Final Examination	1	3	3
Preparation for final exam	1	10	10
Total Workload			**132**
Total Workload/30(h)			**≈ 4.4**
ECTS Credit of the Course			**4**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Technical English II
Course Unit Code	ENG 2202
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	5
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	-
Practice (hour/week)	3
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Phd. Gullu Jabbarova
Name of Lecturer (s)	Phd. Gullu Jabbarova
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	ENG 2101 (Technical English I)
Recommended Optional Program Components	Pre Intermediate English level grammar, reading, writing and listening skills.

Course description:
Technical English is a course for students in technical or vocational education.
It covers the core language and skills that students need to communicate successfully in all technical and industrial specializations.
Technical concepts are clearly presented using motivating texts.
Topics reflect the latest developments in technology and are relevant to student's needs.
The course uses core language common to a range of specializations.
HF-BO3.2 is designed to improve the students' presentation ability. Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

- **To develop students' language skills and capacity to conduct writing task through the vocabulary, listening and speaking skills.**
- **To develop their level of knowledge, communicative capacity, and ability to analyze and reflect on the language.**
- **To give learners the language they need for real-life, hands-on task like explaining a process or analyzing risk and to put into practice the academic skills that they will need to use during their educations.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Oil and gas today	
2	[1], [2]	Discovery	
3	[1], [2]	Hydrocarbons	
4	[1], [2]	Exploration	
5	[1], [2]	Drilling	
6	[1], [2]	Environmental	
7	[1], [2]	Engineering and construction	
8	[1], [2]	Production	Midterm
9	[1], [2]	Transportation and storage	
10	[1], [2]	Refinery processes	
11	[1], [2]	Downstream distribution	
12	[1], [2]	Project management	
13	[1], [2]	Safety and risk management	
14	[1], [2]	Industry future	
15			Final

Recommended Sources

1. **Technical English 4. Course book. Bonamy David. — Longman Pearson, 2011. — 127 p.**
2. **Technical English 4. Workbook. Jacques Christopher. — Longman Pearson, 2011. — 80 p.**
3. **Havard Devold. Oil and gas production handbook. An introduction to oil and gas production, transport, refining and petrochemical industry. ABB ATPA Oil and Gas, 2006 - 2013,**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	10	10
Tutorials	14	2	28
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**163**
Total Workload/30(h)			**≈ 5.43**
ECTS Credit of the Course			**5**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Differential Equations
Course Unit Code	MATH 2202
Type of Course Unit	Compulsory
Level of Course Unit	2nd year of OGEN program
National Credits	0
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Prof. Ramin Rzayev
Name of Lecturer (s)	Prof. Ramin Rzayev
Name of Assistant (s)	
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	MATH 2101
Recommended Optional Program Components	-

Course description:

Differential Equations are the language in which the laws of nature are expressed. Understanding properties of solutions of differential equations is fundamental to much of contemporary science and engineering. The study of differential equations is a beautiful application of the ideas and techniques of calculus to our everyday lives. It could be said that calculus was developed mainly so that the fundamental principles that govern many phenomena could be expressed in the language of differential equations. The course tends to focus on techniques rather than on concepts due to the difficulty in conveying the beauty of the subject in the traditional course on differential equations, because the number of equations that can be treated by analytic techniques is very limited. The differential equations course is one of the few undergraduate courses where it is possible to give students a glimpse of the nature of contemporary mathematical research. One of the major approaches adopted in this course is qualitative. Students are expected to be able to visualize differential equations and their solutions in many geometric ways. For instance, we readily use slope fields, graphs of solutions, vector fields, and solution curves in the phase plane as tools to gain a better understanding of solutions. Students are also asked to become adept at moving among these geometric representations and more traditional analytic representations. Since differential equations are readily studied using the computer, numerical techniques are also emphasized. There are many computer-based tools to investigate the behavior of solutions of differential equations both numerically and graphically. Even if students can find an explicit formula for a solution, they often need to work with the equation both numerically and qualitatively to understand the geometry and the long-term behavior of solutions.

Objectives of the Course:

Learning Outcomes

At the end of the course the student will be able to		**Assessment**
1	demonstrate comprehension and understanding in the topics of the course through symbolic, numeric, and graphic methods;	
2	classify differential equations by order, linearity, and homogeneity;	
3	solve first order linear differential equations both numerically and analytically;	
4	solve linear equations with constant coefficients;	
5	use separation of variables to solve differential equations;	
6	solve exact differential equations;	
7	use variation of parameters to solve differential equations;	
8	use the method of undetermined coefficients to solve differential equations;	
9	determine whether a system of functions is linearly independent using the Wronskian;	
10	model real-life applications using differential equations;	
11	use power series to solve differential equations;	
12	use Laplace transforms and their inverses to solve differential equations;	
13	solve systems of linear differential equations using matrix techniques and eigenvalues;	
14	use numerical methods to solve first-order and higher-order differential equations;	
15	use technology when appropriate and know the limitations of technology;	
16	use deductive reasoning and critical thinking to solve problems;	
Assessment Methods: 1. Final Exam, 2. Independent works 3. Midterm		

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	4
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	5
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4

7	Constant and continuous self-development and learning for a long time.	3
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	4
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction to Differential Equations	
2	[1]	First-Order and Simple Higher-Order Differential Equations	
3	[1]	Theory of Higher-Order Linear Differential Equations	
4	[1]	Theory of Higher-Order Linear Differential Equations (continued)	
5	[1], [2]	Applications of Linear Differential Equations	
6	[1], [2]	Introduction to Systems and Phase Plane Analysis	
7	[1], [2]	Linear Systems of Differential Equations	
8	[1], [2]	Applications of Systems of Linear Differential Equations	Midterm
9	[1], [2],[3]	The Laplace Transform and Its Applications	
10	[1], [2],[3]	Nonlinear Systems and Phenomena	
11	[1], [2],[3]	Series Solutions of Differential Equations	
12	[1], [2],[3]	Numerical Solutions of Differential Equations	
13	[1], [2],[3]	Fourier Series	
14	[1], [2],[3]	Partial Differential Equations	
15			Final

Recommended Sources

TEXTBOOK(S)

1. Kent Nagle, Edward Saff, Arthur Snider. Fundamentals of Differential Equations and Boundary-Value Problems. Addison-Wesley (Pearson), 6th Edt., 2012.

2. Wei-Chau Xie. Differential Equations for Engineers. Cambridge University Press, 2010.

3. Dennis G. Zill and Michael R. Cullen. Differential Equations with Boundary-Value Problems, 8th edt. Brooks Cole, Cengage Learning, 2012.

4. Henry Edwards, David E. Penney, and David Calvis. Differential Equations: Computing and Modeling. Pearson Education, 5th edt. 2015.

5. Dominic Jordan, Peter Smith. Nonlinear Ordinary Differential Equations: An Introduction for Scientists and Engineers. Oxford University Press, 4th Edt. 2007. (Supplementary material)

6. Yunus Cengel, William J. Palm. Differential Equations for Engineers and Scientists. McGraw-Hill Education; 1st Edt., 2012. (Supplementary material)

7. C.G.Lambe, C.J.Tranter. Differential Equations for Engineers and Scientists. Dover Publications, 2018. (Supplementary material)

8. Brian Hunt, Ronald Lipsman, John Osborn, Jonathan Rosenberg. Differential Equations with Matlab. Wiley, 3rd Edt. 2012. (Supplementary material)

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Independent works	20%	
Seminars	0%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of ASOIU Guidelines for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students can use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**170**
Total Workload/30(h)			**≈ 5.67**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Drilling Fluids
Course Unit Code	OGEN 2202
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	6
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	-
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Prof. Doctor Suleymanov Eldar Mammad
Name of Lecturer (s)	Prof. Doctor Suleymanov Eldar Mammad
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 1101
Recommended Optional Program Components	

Course description:

Drilling Fluids works of various oil and gas wells technology, including drilling and completion technology , well completion and stimulation, pumping system, well testing, pipes, cementing the process of drilling equipment and technology in the development of oil and gas wells, cost, economics, regulations, tax incentives.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

To give learners the knowledge about:

- **Provide overview of modern Drilling Fluids industry**
-
- **Provide skillful understanding of Drilling Fluids theory**
- **Perform advanced Drilling Fluids planning and operations related calculations**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Petrophysical properties of reservoir rocks and measurement procedures:	1
2	Fundamental porosity, grain density, permeability and saturation properties;	1, 2, 6
3	Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:	2,3,4, 6
4	Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.	1, 2, 6
5	Determination of formation properties.	2, 3, 6
6	Guidelines to select proper logs in given field conditions.	2,3,4,6

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	5
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction	
2	[1], [2]	Density & Pressure Gradients	
3	[1], [2]	Rheology	
4	[1], [2]	Hydraulics	
5	[1], [2]	Borehole Instability	
6	[1], [2],[3]	Clay Chemistry	
7	[1], [2],[3]	Inhibition	
8	[1], [2],[3]	Invert Oil Emulsion System	Midterm
9	[1], [2],[3]	Contaminants	
10	[1], [2],[3]	Temperature	
11	[1], [2],[3]	Drilled Solids	
12	[1], [2],[3]	Drilling Problems	
13	[1], [2],[3]	*Well Control*	
14	[1], [2],[3]	Cementing Drill-In, Completion and Well Intervention Fluids	
15			Final

Recommended Sources

1. Preparation for the Wellsite DR ILLI ING FLUIDS SHELL

2. . John Ford Drilling Engineering HERIOT-WATT UNIVERSITY ,Department of Petroleum Engineering,Edinburgh, 2013

3. Hussain Rabia Well Engineering & Construction

4. E.M.Suleymanov Cementing of wells in complicated conditions. 2014 Germany,

Assessment		
Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	10	10
Tutorials	10	1	10
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**145**
Total Workload/30(h)			**≈ 4.8**
ECTS Credit of the Course			**5**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Drilling Fluids Laboratory

Course Unit Code	LAB 2201
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	4
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	-
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Prof. Doctor Suleymanov Eldar Mammad
Name of Lecturer (s)	Prof. Doctor Suleymanov Eldar Mammad
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 2201
Recommended Optional Program Components	

Course description:

Drilling Fluids Laboratory works of various oil and gas wells technology, including drilling and completion technology , well completion and stimulation, pumping system, well testing, pipes, cementing the process of drilling equipment and technology in the development of oil and gas wells, cost, economics, regulations, tax incentives.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

To give learners the knowledge about:

- **Provide overview of modern Drilling Fluids Laboratory industry**
- **Provide skillful understanding of Drilling Fluids Laboratory theory**
- **Perform advanced Drilling Fluids Laboratory planning and operations related calculations**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Petrophysical properties of reservoir rocks and measurement procedures:	1
2	Fundamental porosity, grain density, permeability and saturation properties;	1, 2, 6
3	Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:	2,3,4, 6
4	Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.	1, 2, 6
5	Determination of formation properties.	2, 3, 6
6	Guidelines to select proper logs in given field conditions.	2,3,4,6

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3

5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Fundamentals of Drilling Fluids1	
2	[1], [2]	Density1	
3	[1], [2]	Rheology1	
4	[1], [2]	Viscosity1	
5	[1], [2]	Gel Strength1	
6	[1], [2]	Filtration1	
7	[1], [2]	Testing Equipment1	
8	[1], [2]	Fundamentals of Drilling Fluids2	Midterm
9	[1], [2]	Density2	
10	[1], [2]	Rheology2	
11	[1], [2]	Viscosity2	
12	[1], [2]	Gel Strength2	
13	[1], [2]	Filtration2	
14	[1], [2]	Testing Equipment2	
15			Final

Recommended Sources

1. **Drilling Lab Manual** Drilling Fluids Laboratory UNIVERSITY of ABERDEEN

2. . John Ford Drilling Engineering HERIOT-WATT UNIVERSITY ,Department of Petroleum Engineering,Edinburgh, 2013

3. Hussain Rabia Well Engineering & Construction

4. E.M.Suleymanov Changes in the hydrodynamic pressure in the well during the descent of pipes 2015 Germany,Palmarium Academic Publishing

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	2	28
Presentation	1	10	10
Tutorials	14	1	14
Self-study	14	3	42
Midterm Examinations	1	3	3
Preparation for midterm exams	1	7	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**121**
Total Workload/30(h)			**≈ 4.03**
ECTS Credit of the Course			**4**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Petrolphysics & Formation Evaluation
Course Unit Code	0GEN 2202
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	-
Recommended Optional Program Components	

Course description:

Well logging plays an essential role in petroleum exploration and exploitation. It is used to identify the pay zones of gas or oil in the reservoir formations. It gives continuous downhole record and detailed picture of both gradual and abrupt changes in physical properties of subsurface lithology Logging has a central role in the successful development of a hydrocarbon reservoir. Its measurements occupy a position of central importance in the life of a well, between two milestones: the surface seismic survey, which has influenced the decision for the well location, and the production testing.

Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

To give learners the knowledge about:

- **Petrophysical properties of reservoir rocks and measurement procedures:**
- **Fundamental porosity, grain density, permeability and saturation properties;**
- **Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:**
- **Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.**
- **Determination of formation properties.**
- **Guidelines to select proper logs in given field conditions.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Petrophysical properties of reservoir rocks and measurement procedures:	1
2	Fundamental porosity, grain density, permeability and saturation properties;	1, 2,3
3	Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:	2,3,4
4	Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.	1, 2
5	Determination of formation properties.	2, 3
6	Guidelines to select proper logs in given field conditions.	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Petrophysical Parameters	
2	[1], [2]	Petrophysical Parameters and methods for their determination	
3	[1], [2]	Mechanical properties of reservoir rocks and methods for their determination	
4	[1], [2]	Properties of reservoir fluids	
5	[1], [2]	Linear and radial filtration of oil and gas in a porous medium. Darcy's law	
6	[1], [2]	Open Hole Logging Tools I	
7	[1], [2]	Open Hole Logging Tools II	
8	[1], [2]	Open Hole Logging Tools II	Midterm
9	[1], [2]	Cased Hole Logging Tools	
10	[1], [2], [3]	Production Logging	
11	[1], [2], [3]	Data Acquisition	
12	[1], [2], [3]	An Over View Of Krishna-Godavari Basin	
13	[1], [2], [3]	Interpretation. Pre Interpretation	
14	[1], [2], [3]	Interpretation. Cross Plots	
15			Final

Recommended Sources

1. **Formation Evaluation. Heriot-Watt Institute of Petroleum Engineering. — Edinburgh, 2013. — 258p.**
2. **Darling Toby. Well Logging and Formation Evaluation. Elsevier, 2005. — 336 p.**
3. **Schön Jürgen. Basic Well Logging and Formation Evaluation. Bookboon, 2015. — 179 p.**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**170**
Total Workload/30(h)			**≈ 5.67**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Petroleum & Formation Evaluation Laboratory
Course Unit Code	LAB 2202
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	3
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	-
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 2202 (Petrolphysics & Formation Eval.)
Recommended Optional Program Components	

Course description:

Laboratory works of various well logging methods (electrical, acoustic, and radioactive). Application of log interpretation techniques for lithology and hydrocarbon identification and calculation of reservoir parameters (porosity and saturation) for the quantitative evaluation of oil and gas reserves.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

To give learners the knowledge about:

- **Petrophysical properties of reservoir rocks and measurement procedures:**
- **Fundamental porosity, grain density, permeability and saturation properties;**
- **Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:**
- **Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.**
- **Determination of formation properties.**
- **Guidelines to select proper logs in given field conditions.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Petrophysical properties of reservoir rocks and measurement procedures:	1
2	Fundamental porosity, grain density, permeability and saturation properties;	1, 2, 6
3	Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:	2,3,4, 6
4	Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.	1, 2, 6
5	Determination of formation properties.	2, 3, 6
6	Guidelines to select proper logs in given field conditions.	2,3,4,6

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Preparing a logging program	
2	[1], [2]	Coring	
3	[1], [2]	Wellsite mud logging	
4	[1], [2]	Identifying the reservoir	
5	[1], [2]	Identifying the fluid type and contacts	
6	[1], [2]	Permeability determination	
7	[1], [2]	Core capillary pressure analysis	
8	[1], [2]	Shaly sand analysis	Midterm
9	[1], [2]	Nuclear magnetic resonance logging	
10	[1], [2]	Thermal decay neutron interpretation	
11	[1], [2]	Understanding geological maps	
12	[1], [2]	Geosteering	
13	[1], [2]	Horizontal wells drilled above a contact	
14	[1], [2]	Logging tools	
15			Final

Recommended Sources

4. **Formation Evaluation. Heriot-Watt Institute of Petroleum Engineering. — Edinburgh, 2013. — 258p.**
4. **Darling Toby. Well Logging and Formation Evaluation. Elsevier, 2005. — 336 p.**
5. **Schön Jürgen. Basic Well Logging and Formation Evaluation. Bookboon, 2015. — 179 p.**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	2	28
Presentation	1	3	3
Tutorials	12	1	12
Self-study	14	3	42
Midterm Examinations	1	3	3
Preparation for midterm exams	1	3	3
Final Examination	1	3	3
Preparation for final exam	1	9	9
Total Workload			**103**
Total Workload/30(h)			**≈ 3.43**
ECTS Credit of the Course			**3**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Improved Petroleum Recovery
Course Unit Code	OGEN 3101
Type of Course Unit	Compulsory
Level of Course Unit	3d year BSc program
National Credits	5
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 2101 (Reservoir Fluid Flow)
Recommended Optional Programme Components	

Course description:

Enhanced oil recovery (EOR) is oil recovery by the injection of materials not normally present in the reservoir. This definition covers all modes of oil recovery processes (drive, push-pull, and well treatments) and most oil recovery agents.

Enhanced oil recovery technologies are also being used for in-situ extraction of organic pollutants from permeable media. In these applications, the extraction is

referred to as cleanup or remediation, and the hydrocarbon as product.

Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

By the end of the course the students should be able to learn :

- **Primary Recovery**
- **Secondary Recovery**
- **Water Injection**
- **Gas Injection**
- **Limitations and disadvantages of Primary and Secondary Recovery Processes**
- **Tertiary or Enhanced Oil Recovery Methods**
- **Chemical Processes**
- **Miscible displacement methods**
- **Thermal Processes**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	5
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	5

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Geological Factors in Enhanced Oil Recovery	
2	[1], [2]	Determination of Residual Oil Saturation based on Geophysical Well logging techniques	
3	[2], [3]	Gas Injection	
4	[2], [3]	Miscible Flooding	
5	[2], [3]	Carbon Dioxide Flooding	
6	[2], [3]	Polymer Flooding	
7	[2], [3]	Polyacrylamides	
8	[2], [3]	Alkaline Flooding	Midterm
9	[2], [3]	Use of Surfactants in oil recovery	
10	[2], [3]	Steam flooding for Enhanced Oil Recovery	
11	[2], [3]	Operational aspects of steam injection processes	
12	[2], [3]	In-situ combustion technology	
13	[2], [3]	Microbial enhanced oil recovery	
14	[2], [3]	Plasma, microwaves	
15			Final

Recommended Sources

1. **Alvarado V., Manrique E. Enhanced Oil Recovery: Field Planning and Development Strategies. Gulf Professional Publishing. 2010. 208p.**
2. **Yuan B., Wood D. Formation Damage During Improved Oil Recovery: Fundamentals and Applications. Gulf Professional Publishing, 2018. — 663 p.**
3. **Marcel Latil- Enhanced Oil Recovery, 2008**
4. **Shepherd M. Factors Influencing Recovery from Oil and Gas Fields. AAPG Memoir, 2009.**

Assessment

Attendance		
Midterm I	5%	Written Exam

Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	13	13
Tutorials	14	1	14
Self-study	14	4	64
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**160**
Total Workload/30(h)			**≈ 5.3**
ECTS Credit of the Course			**5**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Phase Behavior
Course Unit Code	OGEN 3101
Type of Course Unit	Compulsory
Level of Course Unit	3d year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	3
Course Coordinator	Phd. Vuqar Fataliyev
Name of Lecturer (s)	Phd. Vuqar Fataliyev
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	
Recommended Optional Program Components	General Physics, General Chemistry

Course description:

The course covers the following topics: Samling, conventional and special PVT studies, cubic equations of state, characterizing heptanes- plus fractions, gas-liquid equilibirum calculations with a cubic equation of state.
A wide range of oil and gas systems will be studied in relation to the topics above. Some programming and computer excercises using an EOS-based PVT program will be necessary, with both theoretical and practical project work for each student individually. Project work is mandatory.

Objectives of the Course:

Ingress: The students should know basic chemistry and thermodynamics. Knowledge: The students should understand the application of equations of state, black-oil PVT and heptanes-plus characterization. Skills: The students should understand how to use PhazeComp to compute phase equilibrium calculations and viscosity estimation. General competence: The student should learn to solve problems without solutions being handed out (only provided through in-class partial solutions by the teacher) i.e. relying on their own ability to check and cross-check their work with others, in addition to using the lectures to ask questions about their solutions to problems. Critical self-learning is emphasized. Self-study is also required to decide what supportive reading is needed to understand (1) lectured material and (2) class problems these two defining the course curriculum.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Petrophysical properties of reservoir rocks and measurement procedures:	1
2	Fundamental porosity, grain density, permeability and saturation properties;	1, 2,3
3	Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:	2,3,4
4	Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.	1, 2
5	Determination of formation properties.	2, 3
6	Guidelines to select proper logs in given field conditions.	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Petroleum Reservoir Fluids	
2	[1]	Sampling, Quality Control, and Compositional Analyses	
3	[1], [2], [3]	PVT Experiments	
4	[1], [2], [3]	Equations of State	
5	[1], [2], [3]	C_{7+} Characterization	
6	[1], [2], [3]	Flash and Phase Envelope Calculations	
7	[1], [2], [3]	PVT Simulation	
8	[1], [2]	Physical Properties	Midterm
9	[1], [2]	Transport Properties	
10	[1], [2], [3]	Wax Formation	
11	[1], [2], [3]	Asphaltenes	
12	[1], [2], [3]	Gas Hydrates	
13	[1], [2], [3]	Compositional Variations with Depth	
14	[1], [2]	Formation Water and Hydrate Inhibitors	
15			Final

Recommended Sources

1. **Pedersen K.S., Christensen P.L., Shaikh J.A. Phase Behavior of Petroleum Reservoir Fluids. Second Edition. — CRC Press, Taylor & Francis Group, 2015. — 446 p.**
2. **Bahadori A. Fluid Phase Behavior for Conventional and Unconventional Oil and Gas Reservoirs. Gulf Professional Publishing, 2017. — 545 p.**
3. **Firoozabadi A. Thermodynamics and Applications of Hydrocarbons Energy Production. McGraw-Hill Education, USA, 2016. — 549 p..**

Assessment

Attendance		
Midterm I	5%	Written Exam

Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**170**
Total Workload/30(h)			**≈ 5.67**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Drilling Engineering
Course Unit Code	Ogen 3101
Type of Course Unit	Compulsory
Level of Course Unit	3d year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	6
Course Coordinator	Prof. Doctor Suleymanov Eldar Mammad
Name of Lecturer (s)	Prof. Doctor Suleymanov Eldar Mammad
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	
Recommended Optional Program Components	Basic Calculus

Course description:

Drilling Engineering Technology, including drilling technology , well completion and stimulation, pumping system, well testing, pipes, cementing the process of drilling equipment and technology in the development of oil and gas wells, cost, economics, regulations, tax incentives.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

- **Provide overview of modern drilling engineering industry**
- **Provide skillful understanding of drilling engineering theory**
- **Perform advanced well planning and operations related calculations**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Ability to discuss in depth the Drilling Operations, Rig Components, Formation Pressures, Well Control, Casing, Cementing, Drilling Fluids, Hydraulics, Directional Drilling, Deflection tools and Directional Surveying, Logging, Measurement While Drilling Subsea Drilling, Drilling Problems and Fishing, Introduction to Completion and Interventions	2, 3,4, 5
6	To use power-point for presenting the written projects.	2,3,4
7	The written projects will be presented by the students	2,3,4
8	Decision Making	4,5

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	5
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Overview of Drilling Operations	
2	[1], [2]	Rig Components	
3	[1], [2]	The Drillstring	
4	[1], [2]	Drilling Bits	
5	[1], [2]	Formation Pressures	
6	[1], [2]	Well Control	
7	[1], [2]	Casing	
8	[1], [2]	Cementing	Midterm
9	[1], [2]	Drilling Fluids	
10	[1], [2]	Hydraulic	
11	[1], [2]	Directional Drilling	
12	[1], [2]	Directional Surveying	
13	[1], [2]	Measurement While Drilling	
14	[1], [2]	Subsea Drilling	
15			Final

Recommended Sources

1. John Ford Drilling Engineering HERIOT-WATT UNIVERSITY ,Department of Petroleum Engineering,Edinburgh, 2013
2. Hussain Rabia Well Engineering & Construction
3. C.C.Azar,Q.Robello Samuel. Qazma mühəndisliyi. Bakı,"Nafta-Press"nəşriyyatı,2014
4. E.M.Suleymanov Well fixing 2014 Germany, Palmarium Academic Publishing,

Assessment

Attendance		

Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .
- The students shall behave in professional way to create favorable academic environment during the class hours for themselves and their colleagues. Unauthorized discussions and unethical behavior are strictly prohibited.

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**170**
Total Workload/30(h)			**≈ 5.67**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Drilling Engineering Laboratory
Course Unit Code	LAB 3101
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	3
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	-
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	2
Semester when the course unit is delivered	4
Course Coordinator	Prof. Doctor Suleymanov Eldar Mammad
Name of Lecturer (s)	Prof. Doctor Suleymanov Eldar Mammad
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 3101
Recommended Optional Program Components	

Course description:

Laboratory works of various oil and gas wells technology, including drilling and completion technology , well completion and stimulation, pumping system, well testing, pipes, cementing the process of drilling equipment and technology in the development of oil and gas wells, cost, economics, regulations, tax incentives.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

To give learners the knowledge about:

- **Provide overview of modern Drilling Engineering Laboratory industry**
-
- **Provide skillful understanding of Drilling Engineering Laboratory theory**
- **Perform advanced Drilling Engineering Laboratory planning and operations related calculations**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Petrophysical properties of reservoir rocks and measurement procedures:	1
2	Fundamental porosity, grain density, permeability and saturation properties;	1, 2, 6
3	Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:	2,3,4, 6
4	Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.	1, 2, 6
5	Determination of formation properties.	2, 3, 6
6	Guidelines to select proper logs in given field conditions.	2,3,4,6

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[2]	Mud Weight, Marsh Funnel Viscosity and pH	
2	[2]	Mud Rheology Test	
3	[2]	Filtration, Wall Building and Resistivity	
4	[2]	Mud Weight Control	
5	[1], [2]	Drilling Fluid Contamination Test	
6	[1], [2]	Solid, Liquid Content and Emulsion. Characteristic of Drilling Fluids	
7	[1], [2]	Oil Well Cementing Experiments	
8	[1], [2]	Familiarization and Line-up of Operational Components 1	Midterm
9	[1], [2]	Familiarization and Line-up of Operational Components 2	
10	[1], [2]	Operation of Major Components	
11	[1], [2]	Kick Identifications and Well Shut-in Procedures	
12	[1], [2]	Kick Control Exercises: Well Control Operations	
13	[1], [2]	Oil Well Cementing Test	
14	[1], [2]	Oil Well Cementing Testing equipment	
15			Final

Recommended Sources

1.Department of Petroleum Engineering DRILLING ENGINEERING LABORATORY MANUAL KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

2. John Ford Drilling Engineering HERIOT-WATT UNIVERSITY ,Department of Petroleum Engineering,Edinburgh, 2013

3. Hussain Rabia Well Engineering & Construction

4. E.M.Suleymanov Compositions for cementing oil and gas wells. 2016 Germany,Palmarium Academic Publishing,

Assessment

Attendance		

Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	2	28
Presentation	1	3	3
Tutorials	12	1	12
Self-study	14	3	42
Midterm Examinations	1	3	3
Preparation for midterm exams	1	3	3
Final Examination	1	3	3
Preparation for final exam	1	9	9
Total Workload			**103**
Total Workload/30(h)			**≈ 3.43**
ECTS Credit of the Course			**3**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Senior Design 1,2
Course Unit Code	TECH3101 / TECH3202
Type of Course Unit	Compulsory
Level of Course Unit	3rd year of BS program
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	-
Practice (hour/week)	2/14
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	5/6
Course Coordinator	Phd. Malikov R.Kh.
Name of Lecturer (s)	Phd. Malikov R.Kh.
Name of Assistant (s)	
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	

Course description:

The major focus of the IED course is to expose students to design process, research and analysis, teamwork, communication methods, , engineering standards, and technical documentation.

Students will employ engineering and scientific concepts in the solution of engineering design problems. In addition, students use a state of the 3D solid modeling design software package to help them design solutions to solve proposed problems. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges that increase in difficulty throughout the course.

The students acquaint with the basic knowledge and skills in engineering drawings and the capability to read and interpret blue prints for manufacturing. The students can also develop an understanding of 2D and 3D computer aided drafting with the requirements of good engineering drawings and be able to apply them to their work.

Using computers at the beginning of the engineering education will help the students visualize engineering components. Appropriate sketching exercises will be done during practice hours by using a package program

namely AutoCAD. The CAD software should be perceived by the student as a tool for producing engineering drawings.

Objectives of the Course:

The purpose of this course is to familiarize students with basic concepts and the use of computer technology in the design process.

Students are introduced to basic knowledge and skills in engineering and computer graphics and simulation effects in the design process.

Students have the opportunity to apply simulation effects in practical work.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Get information on computer design	2,3
2	Develop assembly drawings	1,2,3
3	Skillfully apply elements of computer graphics in the design process	1,2,3
4	Understand the basic idea of the simulation process	1,2,3
5	Use simulation effects in the design process	1,2,,3

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Seminars

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	5
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	5

5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	4
7	Constant and continuous self-development and learning for a long time.	4
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	4
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	5
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Senior Design 1

Week	Chapter	Topics	Exam
1	1[3]	Introduction. The methods of projections. Orthogonal projection. Planes of projections. Point. The projections of different points to the plane of projections. Straigh line. Position of straight line relative to projection planes. Relative position of point and straight line. True lenght of straight line segment.	
2	1[3]	Geometric constructions. Dividing and Constructing lines and angles. Dividing of line into two equal parts. Blending of two lines. Blending of Circle and line. Blending of two circles. Internal and external blendings.	
3	1[3]	Dimensioning: Projection lines, Dimension lines, Leader lines, Termination and Origin Indication. Chain dimension, Parallel dimension, Combined dimension, Coordinates dimension. Chord, Arc, Angle, Chamfer.	
4	1[8]	Views. Sectioning. Simple and full sections. Inclined, local, complicated, stepped and broken sections.	
5,6	1[8]	Construction of the sketch of three views of a detail, its sectioning and dimensioning.	
7,8	1[8]	Construction of the third projection of detail on two given projections, its sectioning and dimensioning.	
9			**midterm exam**
10,11	1[9]	Axonometric projections.	
12,13	1[10]	Permanent and non-permanent joining. Threads. Types of threads. Profiles and basic parameters of threads.	

		Representation of threads on Technical Drawing. Symbolic representation of threads on Technical Drawing. Welding joints. Representation of welding on Technical Drawing.	
14,15	1[11]	Assembly drawing	
			Exam
Senior Design 2			
Week	Chapter	Topics	Exam
1,2	2[1]	Introduction to Computer Aided Sketching. Role of CAD in mechanical design	
3,4	2[1]	Computer screen, layout of the software, standard tool bar/menus and description of most commonly used tool bars.	
5,6	2[1]	Coordinate system and reference planes. Creation of 2D environment. Selection of drawing size and scale.	
7,8	2[2,3]	Commands and creation of lines, polylines, rectangle, polygons, splines, circles, ellipse, text.	
9			**midterm exam**
10,11	2[4,5]	Commands of modify bar: move, copy, offset, mirror, rotate, trim, extend, break, chamfer, fillet, curves.	
12,13	2[8]	Dimensioning, line convention, material conventions and lettering. Designing details in the 3D system	
14,15	2[8]	Creation of 3D environment. Modelling, Solid editing. Designing details in the 3D system	

Recommended Sources

TEXTBOOK(S)

1. A First Course in Engineering Drawing K. Rathnam, 2017

2. Scott Onstoff AutoCAD 2016

Assessment

Attendance	10%	Less than 25% class attendance results in NA grade
Presentation	10%	

Independent work	10%	
Midterm Exam	20%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan Ministry of Education for Undergraduate

Studies

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	5	5
Tutorials	10	1	10
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	1	3	3
Final Examination	1	3	3
Preparation for final exam	1	10	10
Total Workload			**132**
Total Workload/30(h)			**≈ 4.4**
ECTS Credit of the Course			**4**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Reservoir Engineering
Course Unit Code	OGEN 3202
Type of Course Unit	Compulsory
Level of Course Unit	3rd year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	-
Practice (hour/week)	3
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Ass. Ramil Mammadov
Name of Lecturer (s)	Ass. Ramil Mammadov
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	-
Recommended Optional Programme Components	Pre Intermediate English level grammar, ODE

Course description:
Estimation of hydrocarbon pore volume and recovery factor. Classification of oil reservoirs. Reservoir performance prediction for solution gas drive, water drive, gas-cap drive, drainage and combination drive reservoirs using material balance approach. Water influx theory. Water and gas coning in oil producing formations. Characterization of fractured reservoirs. Decline Curve Analysis.

Objectives of the Course:

- **This course explains the fundamentals of reservoir engineering and their practical application in conducting a comprehensive field study. 1st mid-term includes fundamentals of reservoir fluid behavior with an emphasis on the classification of reservoir and reservoir fluids. Here the fundamental mathematical expressions that are used to describe the reservoir fluid flow behavior in porous media. Principles of oil and gas well performances calculations are also discussed. Parallel you will be deeply familiar with water influx processes in reservoir.**
- **In the 2nd mid-term, it is introduced the basic principle of oil recovery mechanisms and presented by the generalized form of the material balance equation. Later, waterflooding and Enhanced Oil Recovery methods will be discussed. After gaining knowledge about Gas and fractured reservoirs, modern approach such as reservoir simulation will be discussed and illustrated at the end of the course.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Identify and articulate reservoirs by pressure-temperature diagrams	1
2	Formulate and calculate different types of fluid flow in reservoir	1, 2,3
3	Analysing fluid flow through in porous media	2,3,4
4	How to use dimensionless method to obtain flow parameters in reservoir	1, 2
5	Understand recovery mechanisms by using Material Balance Equation	2, 3
6	Analyzing two-phase flow	2,3,4
7	Application relative permeability curves in reservoir engineering problems	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5

4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	5
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction.	
2	[1]	Reservoir pressures and temperatures Classification of reservoirs and reservoir fluids	
3	[1], [2]	Fundamentals of reservoir fluid flow	
4	[1], [2]	Material balance applied to oil reservoirs	
5	[1], [2]	Comparing Reservoir Drive Mechanisms	
6	[1], [2]	Darcy's law and applications	
7	[1], [2]	Fluid Potential	
8	[1], [2]	Radial Steady State Flow; Well Stimulation	Midterm
9	[1], [2]	The Basic Differential Equation For Radial Flow In A Porous Medium	
10	[1], [2]	Principles of Waterflooding	
11	[1], [2]	Vapour liquid eqilibria and PVT analysis	
12	[1], [2]	Immiscible displacement	
13	[1], [2]	Fractured reservoirs	
14	[1], [2]	Gas reservoirs	
15			Final

Recommended Sources

1. **B.C.Craft, M.Hawkins – Applied petroleum reservoir engineering, 2014**
2. **Reservoir Engineering Handbook by Tarek H Ahmed, 2018**
3. **Reservoir Engineering. Heriot-Watt Institute of Petroleum Engineering, 2005**
4. **Petroleum Reservoir Engineering: Physical Properties by James W. Amyx, Daniel M. Bass & Robert L. Whiting, 1960**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**170**
Total Workload/30(h)			**≈ 5.67**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Transport Phenomenon
Course Unit Code	OGEN 3202
Type of Course Unit	Compulsory
National Credits	0
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	0
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	PhD. Fidan B. Ismayilova
Name of Lecturer (s)	PhD. Fidan B. Ismayilova
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Recommended Optional Programme Components	-

Course description:

Transport Phenomena is the subject which deals with the movement of different physical quantities such as momentum, energy and mass in any chemical or mechanical process a n d combines the basic principles (conservation laws) a n d laws of various types of transport. Transport Phenomena can be classified into three types:

Momentum transport deals with the transport of momentum in fluids and is also known as fluid dynamics. Solution of equation of motion provides information about the velocity distribution in the system.

Energy transport deals with the transport of different forms of energy in a system and is also commonly known as heat transfer. Solution of basic equation of thermal energy provides the information about the temperature distribution in the system. **Mass transport** deals with the transport of various chemical species in a system. The solution of convective diffusion equation provides the information about the concentration distribution in the system.

Although all these fields are developed separately throughout the history of science and technology, it is important to study these transport phenomena together due to following reasons.

These transport phenomena occur frequently and most of the time simultaneously in industrial problems.

All type of transport phenomena can be explained by similar transport and conversion laws. Physical properties which are used to describe transport laws like kinematic viscosity, thermal diffusivity or mass diffusivity play similar role.

The mathematical requirements for solving problems related to transport phenomena are more or less similar.

Objectives of the Course:

Transport phenomena occurring in any system can be studied at different levels. We can study transport at macroscopic level where the transport equations are developed by balancing of physical quantities as input and output streams in a control volume which may provide a fair idea about overall performance of systems. But it cannot provide information at local level. Whereas, the transport phenomena at microscopic level, where the transport equations are developed by balancing physical quantities for a

small control volume and then allowing the control volume to approach zero results in transport equations which are valid at each point in the fluid. Theses equations may be solved by using appropriate assumptions and boundary conditions. Microscopic level of study of system gives the chance to study the systems in much more details and provides more accurate description of the transport phenomena occurring in the system. If required, these equations may be integrated for the whole system for better understanding of the overall performance of the system.

Third level of study of transport phenomena is at molecular level. Here, the transport phenomena are described in terms of molecular structure and intermolecular forces. Study of transport phenomena at this level may be important for theoretical physicist/ chemist because it link the basic characteristic of material or molecules of material to transport properties like viscosity or thermal conductivity but it may not have as much importance for a technologist who is working on actual engineering problems where it may not be possible to integrate the simulations from molecular level to full system.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	To obtain an understanding about rheophysical properties of fluid	1,2,3
2	To learn the main factors affecting mass transfer	1
3	To learn about the types of fluids	2
4	To learn about fluids flow regimes.	1
5	To carry out hydraulic calculation of oil pipelines	1
6	To learn about multiphase transportation	1,2,3
Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm		

Course Contents

Week	Topics	Exam
1	Introduction to basic consepts. The subject of transport phenomena.	
2	General Concepts of a Fluid **Seminar1**. General overview of transport phenomena including various applications	
3	Stress, Pressure, velocity and basic laws.	
4	Main physical properties of fluids. **Seminar2.** Assessment and determination of physical properties	
5	Mass transfer. Diffusion	
6	Energy transfer **Seminar3.** Transformation of kinetic energy	
7	Rheological parameters of transported fluid **Seminar4** Rheological parameter of oil emulsions	
8	Newtonian and non-Newtonian liquids	Midterm
9	Continuity equations **Seminar5.** Bernoulli's equation. .	
10	Flow regimes. Reynolds number. Hydraulic resistance	
11	Pipeline transportation **Seminar6.** Calculation of pipelines	
12	Multiphase flow	
13	Multiphase flow parameters	

	Seminar7 Hydraulic calculation of multiphase flow	
14	Determination optimal flow rate for multiphase flow	
15		Final

Recommended Sources

1. Larry A.Glasgow, Transport Phenomena (An introduction to advanced topics), John Wiley & Sons, Inc., The USA 2010.
2. L.Gary Leal, Advanced Transport Phenomena (Fluid mechanics and Convective Transport Processes), Gambridge University Press, 2007.
3. R. B. Bird, W. E. Stewart and E. N. Lightfoot, TransportPhenomena, 2nd Ed., John Wiley & Sons, Inc., 2002.

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Seminars (Quizzes)	0%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Guidelines of Azerbaijan State University of Oil and Industry for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	13	13
Tutorials	14	1	14
Self-study	14	4	64
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**160**
Total Workload/30(h)			**≈ 5.3**
ECTS Credit of the Course			**5**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Production Engineering
Course Unit Code	OGEN 3202
Type of Course Unit	Compulsory
Level of Course Unit	3rd year BSc program
National Credits	5
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	-
Practice (hour/week)	3
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	6
Course Coordinator	Ass. Ramil Mammadov
Name of Lecturer (s)	Ass. Ramil Mammadov
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	-
Recommended Optional Program Components	Pre Intermediate English level grammar, reading, writing and listening skills.

Course description:
Drill stem testing, well completion methods, completion fluids and sand control. Perforating, well head equipment and flow control devices, production packers, oil and gas separators. Flowing well performance, sucker rod pumping, submersible electrical centrifugal pumping, well stimulation techniques; acidizing, hydraulic fracturing.

Objectives of the Course:

- **The main objective is to give an introductory level of understanding about production system from subsurface to surface facilities and transportation, description of near wellbore dynamic behavior, fluid properties, flow assurance and deterioration of flow rates. Also, solution of partial differential equations will be practiced for solving complicated fluid flow equations. Inform students with up to date technologies in the world.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Design a production system and apply various optimization techniques	1
2	Describe the options with constrains and advantages for producing from multiple production zones	1, 2,3
3	Predict unexpected behavior of wellbore pressure	2,3,4
4	Understand reservoir and well integrity specifics.	1, 2
5	Distinguish between different types of Artificial Lift systems and their application	2, 3
6	Solve complicated equations regarding single and multiphase flow.	2,3,4
7	Research on state-of-the-art technologies and understand their working principles	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3

5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	5

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[2]	Fluid Characterization	
2	[2]	Fluid Properties: Black Oil models	
3	[2]	Fluid Properties: Compositional models	
4	[2]	Multiphase-Flow Pressure-gradient prediction	
5	[2]	Restricted flow into the wellbore	
6	[1], [2], [3]	Formation Damage	
7	[1], [2], [3]	Matrix Acidizing	
8			Midterm
9	[1], [2], [3]	Hydraulic Fracturing	
10	[1], [2], [3]	Unstable formations and Sand Control	
11	[1], [2], [3]	Fundamentals of Artificial Lift	
12	[1], [2], [3]	Gas Lift	
13	[1], [2], [3]	Flow Assurance I	
14	[1], [2], [3]	Flow Assurance II	
15			Final

Recommended Sources

1. **Surface Production Operations, Volume 1: Design of Oil Handling Systems and Facilities by Ken E. Arnold, Maurice Stewart, 2007**
2. **Michael J Economides, A.Daniel Hill, Christine Ehllg-Economides – Petroleum production systems, 2012**
3. **Surface Production Operations: Vol 2: Design of Gas-Handling Systems and Facilities by Maurice Stewart, Ph.D., P.E., 2014**
4. **Petroleum Production Engineering: A Computer Assisted Approach, BoyunGuo, William C. Lyons, Ali Ghalambor, Elesevier Science & Technology Books, 2007.**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	13	13
Tutorials	14	1	14
Self-study	14	4	64
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**160**
Total Workload/30(h)			**≈ 5.3**
ECTS Credit of the Course			**5**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Production Engineering Lab
Course Unit Code	LAB 3201
Type of Course Unit	Compulsory
Level of Course Unit	3rd year BSc program
National Credits	0
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	-
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	2
Semester when the course unit is delivered	1
Course Coordinator	Ass. Ramil Mammadov
Name of Lecturer (s)	Ass. Ramil Mammadov
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 3202 (Production Engineering)
Recommended Optional Program Components	

Course description:

Drill stem testing, well completion methods, completion fluids and sand control. Perforating, well head equipment and flow control devices, production packers, oil and gas separators. Flowing well performance, sucker rod pumping, submersible electrical centrifugal pumping, well stimulation techniques; acidizing, hydraulic fracturing.

Objectives of the Course:

To give learners the knowledge about:

- **The main objective is to give an introductory level of understanding about production system from subsurface to surface facilities and transportation, description of near wellbore dynamic behavior, fluid properties, flow assurance and deterioration of flow rates. Also, solution of partial differential equations will be practiced for solving complicated fluid flow equations. Inform students with up to date technologies in the world.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Design a production system and apply various optimization techniques	1
2	Describe the options with constrains and advantages for producing from multiple production zones	1, 2, 6
3	Predict unexpected behavior of wellbore pressure	2,3,4, 6
4	Understand reservoir and well integrity specifics.	1, 2, 6
5	Distinguish between different types of Artificial Lift systems and their application	2, 3, 6
6	Solve complicated equations regarding single and multiphase flow.	2,3,4,6

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work Resear

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3

5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	5

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Fluid classification	
2	[1], [2], [3]	Data Analysis	
3	[1], [2], [3]	Vazquez & Beggs equation	
4	[2], [3]	Beggs & Robinson equation	
5	[2], [3]	Evaluation of Wellbore pressure gradient	
6	[2], [3]	Pressure gradient prediction in annuli	
7	[2], [3]	Skin factor and related concepts	
8			Midterm
9	[1], [2], [3]	Flowing well performance	
10	[1], [3]	Well stimulation techniques	
11	[1], [3]	Acidizing	
12	[1], [3]	Hydraulic fracturing	
13	[1], [3]	Gas lift mechanics	
14	[1], [2], [3]	Flow assurance	
15			Final

List of practicals

1. Predicting the pressure gradient in the well using empirical relationships and mechanical models. Taking / not taking into account the flow regimes conducting the empirical classification.
2. Well operation by compressor method. Gaslift and airlift. Scopes of compressor operation, its advantages and disadvantages.
3. Factors that adversely affect the operation of the sucker rod pump. Control over the optimal operating mode of the pump. Dynamograph and dynamometers.
4. Pressure loss evaluation for two phase flow in pipe line and optimization of line size.
5. Analysis of well problem by inflow and outflow characteristics.
6. To study flow assurance related problems and remedial treatment to solve it.
7. Study of multiphase flow regimes with their characteristics.

Recommended Sources

1. **Surface Production Operations, Volume 1: Design of Oil Handling Systems and Facilities by Ken E. Arnold, Maurice Stewart, 2007**
2. **Michael J Economides, A.Daniel Hill, Christine Ehllg-Economides – Petroleum production systems, 2012**
3. **Surface Production Operations: Vol 2: Design of Gas-Handling Systems and Facilities by Maurice Stewart, Ph.D., P.E., 2014**
4. **Production Technology. Heriot-Watt Institute of Petroleum Engineering. — Edinburgh, 2005.**

Assessment		
Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	2	28
Presentation	1	10	10
Tutorials	14	1	14
Self-study	14	3	42
Midterm Examinations	1	3	3
Preparation for midterm exams	1	7	7
Final Examination	1	3	3
Preparation for final exam	1	14	14
Total Workload			**121**
Total Workload/30(h)			**≈ 4.03**
ECTS Credit of the Course			**4**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Natural Gas Engineering
Course Unit Code	OGEN 4101
Type of Course Unit	Compulsory
Level of Course Unit	4 year BSc program
National Credits	4
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Phd. Vuqar Fataliyev
Name of Lecturer (s)	Phd. Vuqar Fataliyev
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	
Recommended Optional Program Components	

Course description:

This course will provide the student with knowledge of advanced, current and practical topics in Natural Gas Engineering. The topics will focus on operations and challenges related to the production of gas from the wellhead to market. An over-riding objective is to provide the student with exposure to practical concepts, to apply basic analytical and engineering techniques and methods and to provide an experience to address issues in a business-like setting.

Objectives of the Course:

The student will be able to:
1. Fully explain the process and parties involved to move gas from the wellhead to market.
2. Identify critical regulatory and commercial requirements for marketable gas
3. Determine appropriate requirements and associated processing options to make gas marketable
4. Identify causes, monitoring techniques and mitigation approaches for corrosion.
5. Understand and apply risk management principles as related to production, storage and transmission operations
6. Develop and apply basic process logic for control/automation operations
7. Identify regulatory requirements, environmental and social concerns, logistical considerations and basic construction techniques and practices for well site development
8. Apply various decision making methods, including multi-objective analysis to natural gas development projects.
9. Develop and apply basic project management techniques and processes.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Petrophysical properties of reservoir rocks and measurement procedures:	1
2	Fundamental porosity, grain density, permeability and saturation properties;	1, 2,3
3	Multiphase rock and fluid interactions, interfacial tension, capillary pressure, wettability and relative permeability properties:	2,3,4
4	Principles and operation of gamma ray, self potential, caliper, resistivity (micro and focused), density neutron, sonic, cement bond and variable density; diameter of well logging tools. Interpretation of well log and their cross plotting techniques.	1, 2
5	Determination of formation properties.	2, 3
6	Guidelines to select proper logs in given field conditions.	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	5

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction	
2	[1]	Properties of Natural Gas	
3	[1]	Gas Reservoir Deliverability	
4	[1]	Wellbore Performance	
5	[1]	Choke Performance	
6	[1], [2], [3]	Well Deliverability	
7	[1], [2], [3]	Separation	
8	[1], [2], [3]	Dehydration of Natural Gas	Midterm
9	[1], [2], [3]	Removal of Acid Gases	
10	[1], [2], [3]	Compression and Cooling	
11	[1], [2], [3]	Volumetric Measurement	
12	[2], [3]	Transportation	
13	[2], [3]	Liquid Loading on Gas Wells	
14	[2], [3]	Hydrate Control. Pipeline Cleaning	
15			Final

Recommended Sources

1. **Guo B., Ghalambor A. Natural Gas Engineering Handbook. 2nd edition. — Gulf Publishing Company, Houston, Texas, 2012. XX, 472 p.**
2. **Wang X., Economides M. Advanced Natural Gas Engineering. Gulf Publishing Company, 2009. — 368 p.**
3. **Lyons William, Plisga Gary J., Lorenz Michael D. (eds.) Standard Handbook of Petroleum and Natural Gas Engineering. 3rd Edition. — Gulf Professional Publishing, 2016.**

Assessment

Attendance		

Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	5	5
Tutorials	10	1	10
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	1	3	3
Final Examination	1	3	3
Preparation for final exam	1	10	10
Total Workload			**132**
Total Workload/30(h)			**≈ 4.4**
ECTS Credit of the Course			**4**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Well Design Control
Course Unit Code	OGEN 4101
Type of Course Unit	Compulsory
Level of Course Unit	3d year BSc program
National Credits	4
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	6
Course Coordinator	Prof. Doctor Suleymanov Eldar Mammad
Name of Lecturer (s)	Prof. Doctor Suleymanov Eldar Mammad
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 3101Drilling Engineering
Recommended Optional Program Components	Basic Calculus

Course description:

Well Design Control Technology, including drilling and kick technology , well completion and stimulation, pumping system, well testing, pipes, cementing the process of drilling equipment and technology in the development of oil and gas wells, cost, economics, regulations, tax incentives.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

- **Provide overview of modern Well Design Control industry**
- **Provide skillful understanding of Well Design Control theory**
- **Perform advanced Well Design Control planning and operations related calculations**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Ability to discuss in depth the Drilling Operations, Rig Components, Formation Pressures, Well Control, Casing, Cementing, Drilling Fluids, Hydraulics, Directional Drilling, Deflection tools and Directional Surveying, Logging, Measurement While Drilling Subsea Drilling, Drilling Problems and Fishing, Introduction to Completion and Interventions	2, 3,4, 5
6	To use power-point for presenting the written projects.	2,3,4
7	The written projects will be presented by the students	2,3,4
8	Decision Making	4,5

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3

2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Primary Control	
2	[1], [2]	Secondary Control	
3	[1], [2]	Primary Indicators of a Kick	
4	[1], [2]	Secondary Indicators of a Kick	
5	[1], [2]	SECONDARY CONTROL 1	
6	[1], [2]	SECONDARY CONTROL 2	
7	[1], [2]	SECONDARY CONTROL 2	
8	[1], [2]	WELL KILLING PROCEDURES 2	Midterm
9	[1], [2]	BOP EQUIPMENT 1	
10	[1], [2]	BOP EQUIPMENT 2	
11	[1], [2]	BOP STACK ARRANGEMENTS 1	
12	[1], [2]	BOP STACK ARRANGEMENTS 2	
13	[1], [2]	**overview of modern Well Design Control 1**	
14	[1], [2]	**overview of modern Well Design Control 2**	
15			Final

Recommended Sources

1. John Ford Drilling Engineering HERIOT-WATT UNIVERSITY ,Department of Petroleum Engineering,Edinburgh, 2013
2. Hussain Rabia Well Engineering & Construction
3. C.C.Azar,Q.Robello Samuel. Qazma mühəndisliyi. Bakı,"Nafta-Press"nəşriyyatı,2014
4. E.M.Suleymanov Prevention and elimination of accidents and complications when drilling wells 2016 Germany, Palmarium Academic Publishing

Assessment		
Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .
- The students shall behave in professional way to create favorable academic environment during the class hours for themselves and their colleagues. Unauthorized discussions and unethical behavior are strictly prohibited.

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	5	5
Tutorials	10	1	10
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	1	3	3
Final Examination	1	3	3
Preparation for final exam	1	10	10
Total Workload			**132**
Total Workload/30(h)			**≈ 4.4**
ECTS Credit of the Course			**4**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Well Comp; P & R
Course Unit Code	OGEN 4101
Type of Course Unit	Compulsory
Level of Course Unit	2nd year BSc program
National Credits	4
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	-
Practice (hour/week)	3
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Prof. Doctor Suleymanov Eldar Mammad
Name of Lecturer (s)	Prof. Doctor Suleymanov Eldar Mammad
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	
Recommended Optional Program Components	

Course description:

Completion oil and gas wells technology, including drilling and completion technology , well completion and stimulation, pumping system, well testing, pipes, cementing the process of drilling equipment and technology in the development of oil and gas wells, cost, economics, regulations, tax incentives.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

By the end of the course the students should be able to learn :

- **Provide overview of modern Completion oil and gas wells industry**
-
- **Provide skillful understanding of Completion oil and gas wells theory**
- **Perform advanced Completion oil and gas wells planning and operations related calculations**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5

4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [3]	Introduction	
2	[1], [3]	Open Hole Completion Techniques	
3	[1], [2]	Perforating	
4	[1], [2], [3]	Hydraulic Fracturing	
5	[1], [2], [3]	Acid Fracturing and Stimulation	
6	[1], [2], [3]	Sand Control	
7	[1], [2], [3]	Sand Control Screen Types	
8	[1], [2], [3]	Open Hole Gravel Packs	Midterm
9	[1], [2], [3]	Cased Hole Gravel Packs and Frac Packs	
10	[1], [2], [3]	Expandable Screens	
11	[1], [2], [3]	Completion Equipment	
12	[1], [2], [3]	Packers	
13	[1], [2], [3]	Completion Fluids and Filtration	
14	[1], [2], [3]	underbalance drilling, Completions for Heavy Oil and Steam Injection	
15			Final

Recommended Sources

1.Jonathan Bellarby WELL COMPLETION DESIGN SPE*(SocietyofPetroleumEngineers)Aberdeen, 2009*

2. Hussain Rabia Well Engineering & Construction

3. John Ford Drilling Engineering HERIOT-WATT UNIVERSITY ,Department of Petroleum Engineering,

Edinburgh,2013

4. E.M.Suleymanov Installation of cement bridges in oil and gas wells. 2015 Germany, Palmarium academic publishing

Assessment

Attendance		

Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	5	5
Tutorials	10	1	10
Self-study	14	4	56
Midterm Examinations	1	3	3
Preparation for midterm exams	1	3	3
Final Examination	1	3	3
Preparation for final exam	1	10	10
Total Workload			**132**
Total Workload/30(h)			**≈ 4.4**
ECTS Credit of the Course			**4**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Transportation and storage of natural gas
Course Unit Code	OGEN 5011
Type of Course Unit	Elective
Level of Course Unit	4th year
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	0
Year of Study	3
Semester when the course unit is delivered	7
Course Coordinator	PhD. Fidan B. Ismayilova
Name of Lecturer (s)	PhD. Fidan B. Ismayilova
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	-

Course description: Natural gas is an environment friendly, clean-burning fuel, offering important environmental benefits compared to other fossil fuels. It is also a remarkably safe source of energy when transported, stored, and used. The emergence of natural gas in the global markets further underscores the importance of gas transmission and processing.

Natural gas is the most energy efficient fossil fuel it offers important energy saving benefits when it is used instead of oil or coal. Although the primary use of natural gas is as a fuel, it is also a source of hydrocarbons for petrochemical feedstock and a major source of elemental sulphur, an important industrial chemical. Its popularity as an energy source is expected to grow substantially in the future because natural gas can help achieve two important energy goals for the twenty-first century providing the sustainable energy supplies and services needed for social and economic development and reducing adverse impacts on global climate and the environment in general. Natural gas consumption and trade have been growing steadily over the past two decades and natural gas has strengthened its position in the world energy mix. Although natural gas demand declined in 2009, as a result of the economic slowdown, it is expected to resume growth in both emerging and traditional markets in the coming decades. Such increase in the near future will be driven because of additional demand in current uses, primarily power generation. There is yet little overlap between the use of natural gas and oil in all large markets. However, there are certain moves in the horizon, including the electrifying of transportation, which will push natural gas use to ever higher levels.

Objectives of the Course:

The objectives of the course are an introduction to natural gas by describing the origin and composition of natural gas, gas sources, phase behaviour and properties, transportation methods and storage facilities.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	To obtain an understanding about methods of gas transportation	1,2,3
2	To learn the main factors affecting gas transportation	1
3	To learn about the main gas pipelines	2
4	To carry out hydraulic calculation of gas and gas-condensate pipelines	1
5	To learn about multiphase flow	1
6	To learn about mail gas storage facilities	1,2,3

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm

Course Contents

Lecture	Topics	Exam
1	Introduction. Natural gas fundamentals. Natural gas properties Methods of natural gas transmission Seminar 1. Main features of Natural gas transmission	
2	Basic concepts of NG processing. Gathering and transportation of associated gas.	
3	Hydraulic calculation of gas pipeline Seminar 2. Example of Hydraulic calculation of gas pipeline	
4	Main properties of LNG	
5	Transportation of LNG Seminar 3. Specific features of LNG	
6	Hydraulic calculation of LNG pipeline	
7	Seminar 4. Hydraulic calculation of LNG pipelines	
8	Multiphase gas pipelines	Midterm
9	Multiphase flow parameters Seminar 5. Multiphase flow patterns	
10	Condensate production	
11	Calculation of gas-condensate pipeline Seminar 6. Example of Calculation of gas-condensate pipeline	
12	Hydrate formation	
13	Natural Gas Storage. Seminar 7. Underground storage facilities	
14	LNG storage	
15		Final Exam

Recommended Sources

1. Saeid M., William A.Poe, John Y.Mak. Handbook of Natural Gas Transmission and Processing (Third edition). Elsevier Inc. 2015.
2. A.P.Szilas. Production and transport of oil and gas. Part B:gathering and transport. Elsevier Science Publishers, Amsterdam, The netherlands, 1986.

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade

Presentation	20%	
Seminars (Quizzes)	0%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria
Final grades are determined according to the Guidelines of Azerbaijan State University of Oil and Industry for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Oil transportation and storage
Course Unit Code	OGEN 5012
Type of Course Unit	Elective
Level of Course Unit	4th year
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	0
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	PhD. Fidan B. Ismayilova
Name of Lecturer (s)	PhD. Fidan B. Ismayilova
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	-

Course description:

The **transportation of oil** is the final step that oil takes before it is distributed to consumers. The transportation of oil is a part of midstream industry. After oil has been extracted from the ground, it requires transportation and distribution to refineries and upgraders that convert the oil into usable components. After refining and upgrading, the usable petroleum products are then transported again to distribution locations worldwide. Thus, oil is transported both in its initial crude form and as a final product.

There are several different methods of transportation, all of which are becoming increasingly important. Advances in exploration and extraction techniques (like offshore drilling), means that oil is being located and recovered from increasingly remote locations across the globe. This coupled with an increasing demand for petroleum products has resulted in oil extraction and refining and being very far from where people are using gasoline, diesel and kerosene. This separation of supply and demand makes transportation vital in the petroleum industry.

Objectives of the Course:

The objectives of the course are an introduction to oil by describing the origin and composition of crude oil, oil sources, transportation methods, installation for oil trnasportation, pump stations, complications during oil transportation, and storage facilities.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	To obtain an understanding about methods of transportation of oil and oil products	1,2,3
2	To learn the main factors affecting oil transportation	1
3	To learn about the main oil pipelines	2
4	To carry out hydraulic calculation of oil pipelines	1
5	To learn about multiproduct pipelines	1
6	To learn about mail oil storage facilities	1,2,3

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm

Course Contents

Week	Topics	Exam
1	Introduction to oil transportation. Short historical reference General information about transportation of oil and oil products. Seminar 1. Classification of oil pipelines	
2	Main parameters for oil pipeline calculation	
3	Hydraulic gradient Seminar 2. An example of hydraulic calculation of oil pipeline	
4	Wall thickness and stress calculation for pipelines	
5	Consecutive transportation of oil and oil products. Seminar 3. Factors affecting mix formation in multiproduct pipelines	
6.	Reducing the volume of mixture during consecutive transportation	
7	Seminar 4. Interface processing	
8	Multiphase oil pipelines	Midterm
9	Transportation of oil emulsions Seminar 5. Multiphase flow parameters	
10	Complications during oil transportation. Wax deposition process:mechanism and affecting factors	
11	Leak detection Seminar 6. Leak detection systems	
12	Pipeline pigging	
13	Storage of oil and oil products Seminar 7. Types of oil storage tanks	
14	The determination of necessary wall thickness of cylindrical oil tank	
15		Final exam

Recommended Sources

1. Boyun Guo, William C. Lyons, Ali Ghalambor. Petroleum Production Engineering (A Computer-Assisted Approach). Elsevier Science and technology books, 2007.
2. The Oil and Gas Industry.Joseph F.Hilyard. Penn Well Corporation, The USA, 2012.

3. A.P.Szilas. Production and transport of oil and gas. Part B:gathering and transport. Elsevier Science Publishers, Amsterdam, The netherlands, 1986.

Assessment

Attendance	0%	Less than 25% class attendance results in NA grade
Presentation	20%	
Seminars (Quizzes)	0%	
Midterm Exam	30%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Guidelines of Azerbaijan State University of Oil and Industry for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Directional Drilling Tools and Calculations
Course Unit Code	OGEN 5005
Type of Course Unit	Elective
Level of Course Unit	3d year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	Ogen 3101 (Drilling Engineering)
Recommended Optional Program Components	Basic Calculus

Course description:

Directional and Horizontal Well Technology, including horizontal drilling, horizontal well completion and stimulation, pumping and lift system, well testing, horizontal wells in waterflooding and enhanced oil recovery, cost, economics, regulations, tax incentives.
Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

- **Provide overview of modern directional and horizontal drilling engineering industry**
- **Provide skillful understanding of directional and horizontal drilling engineering theory**
- **Perform advanced directional and horizontal well planning and operations related calculations**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Ability to discuss in depth the Drilling Operations, Rig Components, Formation Pressures, Well Control, Casing, Cementing, Drilling Fluids, Hydraulics, Directional Drilling, Deflection tools and Directional Surveying, Logging, Measurement While Drilling Subsea Drilling, Drilling Problems and Fishing, Introduction to Completion and Interventions	2, 3,4, 5
6	To use power-point for presenting the written projects.	2,3,4
7	The written projects will be presented by the students	2,3,4
8	Decision Making	4,5

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3

2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1],[3]	Reasons for drilling deviated wells	
2	[1],[3]	Coordinate Systems	
3	[1],[3]	Universal Transverse Mercator (UTM)	
4	[1],[3]	Reference Directions	
5	[1],[3]	Directional Well Planning	
6	[1],[3]	Types Of Well Profiles	
7	[1],[3]	Mud Motors	
8	[1],[3]	Deflection Tools	Midterm
9	[1],[3]	Orientation Of deflection Tools	
10	[1],[3]	Bottom Hole Assemblies (BHA)	
11	[1],[3]	Survey Tools	
12	[1],[3]	Trajectory Calculations	
13	[1],[3]	Dogleg Severity	
14	[1],[3]	Anti-Collision Planning	
15			Final

Recommended Sources

1. **Hossain M.E. Fundamentals of Drilling Engineering: Multiple Choice Questions and Workout Examples for Beginners and Engineers. Wiley, 2017.**
2. **Mitchell R.F., Miska S.Z. Fundamentals of Drilling Engineering. Society of Petroleum Engineers, 2011. — 710 p. — (SPE Textbook Series, Vol. 12).**
3. **Richard S. Carden, Robert D. Grace, Directional Horizontal Drilling Manual PetroSkills. Tulsa, Oklahoma, Petroskills, LLC. AN OGCI Company, 2007, 409 p.**
4. **Speight J.G. Formulas and Calculations for Drilling Operations. 2nd ed. — Wiley, 2018..**

Assessment

Attendance		

Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .
- The students shall behave in professional way to create favorable academic environment during the class hours for themselves and their colleagues. Unauthorized discussions and unethical behavior are strictly prohibited.

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Well Stimulation
Course Unit Code	OGEN 5006
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 3202 (Reservoir Engineering)
Recommended Optional Program Components	

Course description:
Technical English is a course for students in technical or vocational education.
It covers the core language and skills that students need to communicate successfully in all technical and industrial specializations.
Technical concepts are clearly presented using motivating texts.
Topics reflect the latest developments in technology and are relevant to student's needs.
The course uses core language common to a range of specializations.
HF-BO3.2 is designed to improve the students' presentation ability. Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

By the end of the course the students should be able to learn :

- **Reservoir Stimulation in Petroleum Production**
- **Inflow performance**
- **Tubing performance and Nodal analysis**
- **Well and reservoir testing**
- **Rock mechanics**
- **Rock and fluid mechanics**
- **Hydraulic fracturing**
- **Mechanics of hydraulic fracturing**
- **Fracturing Fluid Chemistry and Proppants**
- **Fracture Treatment Design**
- **Sandstone and carbonate acidizing design**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Reservoir Stimulation in Petroleum Production	
2	[1]	Formation Characterization : Well and Reservoir Testing	
3	[1]	Parameter estimation from pressure transient data	
4	[1]	Formation Characterization : Rock Mechanics	
5	[1]	Formation Characterization: Well Logs	
6	[1]	Mechanics of Hydraulic Fracturing	
7	[1]	Fracturing Fluid Chemistry and Proppants	
8	[1]	Performance of Fracturing Materials	Midterm
9	[1]	Introduction to Matrix Treatments	
10	[1]	Formation Damage : Origin , Diagnosis and Treatment	
11	[1]	Additives in Acidizing Fluids	
12	[1]	Fundamentals of Acid Stimulation	
13	[1]	Carbonate and Sandstone Acidizing	
14	[1]	Matrix Stimulation Treatment Evaluation	
15			Final

Recommended Sources

1. **Gao Changhong. Petroleum Production Technology. Science Press, 2017. — 257 p.**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam

Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Offshore Engineering
Course Unit Code	OGEN 5001
Type of Course Unit	Elective
Level of Course Unit	3d year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	5
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 1101, OGEN 3101
Recommended Optional Program Components	Basic Calculus

Course description:

Tremendous strides have been made in the last decades in the advancement of offshore exploration and production of minerals. This has given rise to developments of new concepts and structures and material for application in the deep oceans. This course is covers the important aspects of offshore structure design, installation and operation, the basic background material and its application in offshore engineering. Particular emphasis is placed in the application of the theory to practical problems. It includes the practical aspects of the offshore structures, simple description of the various components of the offshore engineering and their functions. Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

Objectives of the Course:

- **The primary purpose of the course is to provide the important practical aspects of offshore engineering.**
- **Offshore engineering encompasses a considerable number of very specialized and often completely unrelated disciplines.**
- **They can be categorised into three core activities, namely Construction, Production and Reservoir Engineering.**
- **Opportunity to continue education and development in all deepwater subject matters.**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Ability to discuss in depth probabilistic design of offshore structure, fixed offshore platform design, floating offshore platform design, mooring systems, drilling and production risers,topside facilities layout development, design and construction of offshore pipelines, design for reliability: human and organisational factors physical, modelling of offshore structures, offshore installation materials for offshore applications, geophysical and geotechnical design	2, 3,4, 5
6	To use power-point for presenting the written projects.	2,3,4
7	The written projects will be presented by the students	2,3,4
8	Decision Making	4,5

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program		
		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Offshore Structures	
2	[2]	Support Vessels	
3	[2]	Safety Systems	
4	[1], [2]	Piping Systems	
5	[1], [2]	Process Pressure Vessels	
6	[1], [2]	Oil and Gas Production	
7	[1], [2]	Underwater Engineering	
8	[1], [2]	Sub-sea Wells	Midterm
9	[1], [2]	Drilling	
10	[1], [2]	Drill Ship Equipment	
11	[1], [2]	The Well Component Parts	
12	[1], [2]	Mudline	
13	[1], [2]	Wireline Operations	
14	[1], [2]	Workover Operations	
15			Final

Recommended Sources

1. **Aird Peter. Deepwater Drilling: Well Planning, Design, Engineering, Operations, and Technology Application. Gulf Professional Publishing, 2019. — 670 p.**
2. **Speight James G. Handbook of Offshore Oil and Gas Operations. Gulf Professional Publishing; Elsevier, 2015. — 429 p.**

Assessment		
Attendance		

Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .
- The students shall behave in professional way to create favorable academic environment during the class hours for themselves and their colleagues. Unauthorized discussions and unethical behavior are strictly prohibited.

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Pressure Control
Course Unit Code	OGEN 5010
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	OGEN 3101, LAB 3101
Recommended Optional Program Components	Students are expected to have at least basic familiarity with: single and multi-phase flow in porous media, reservoir engineering, and programming in Matlab or Python.

Course description:
This is the subject accompanying Pressure Control.
Porous sedimentary formations penetrated by the rock bit contain fluids such as oil, gas or salt water. If the hydrostatic pressure of the drilling fluid drops below the formation pore pressure, pore fluid will enter the well and "kick" the mud out of the well. To control the pressure while drilling you need to understand the behavior of gas. This course aims at explaining the physics and the engineering approaches behind pressures in the sediments, detection of unstable wellbores, equipments necessary to close and kill the well, killing methods and offshore challenges.

Objectives of the Course:

Formation Pressure
Killing operation
Gas behavior
Deep water and cementing issues
Additional information.

Learning Outcomes

	At the end of the course the student should be able to	Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	4

2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Well Intervention Pressure Control Incidents	
2	[1], [2]	Annulus Pressure Monitoring in Well Intervention	
3	[1], [2]	Risk Management	
4	[1], [2]	Well Intervention Pressure Control Training and Assessment	
5	[1], [2]	Hydrostatic Pressure	
6	[1], [2]	Flow tests: overview	
7	[1], [2]	Formation Pressure	
8	[1], [2]	Formation Injectivity Pressure (Leak-off pressure)	Midterm
9	[1], [2]	Primary Well (Pressure) Control	
10	[1], [2]	Secondary Well (Pressure) Control	
11	[1], [2]	Blow Out Preventers (BOPs) and other Pressure Control Equipment (PCE).	
12	[1], [2]	Inflow Testing	
13	[1], [2]	Shut-In Procedures	
14	[1], [2]	Well Kill Methods	
15			Final

Recommended Sources

1. Skalle P. Pressure Control During Oil Well Drilling. Pål Skalle & Ventus Publishing ApS, 2011.
2. Skalle P. Exercises in Pressure Control During Drilling. 5th Ed. — Bookboon, 2015. — 109 p

Assessment

Attendance		
Midterm I	5%	Written Exam

Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Simulating of Geosystems
Course Unit Code	OGEN 5013
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	
Recommended Optional Program Components	

Course description:
Earth Sciences is becoming more focused on system-level approaches to understanding the behavior of the Earth. The course will consider geosystems from different disciplines of Earth Science and integrates them into a single systems-oriented perspective. The course also uses simple experiments and graphical imaging/visualizing/computermodeling tools to develop and illustrate the systems concepts. Students will be expected to become familiar with use of excel spreadsheets, simple matlab codes, and use of some community platforms for running more sophisticated models.

Objectives of the Course:

Introduction to Geosystems
Climate System & Radiation Balance
Carbon Cycle
Civilization as a Geosystem

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5

4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Geosystems as dynamical Systems. Conceptualization	
2	[1]	Geosystem: Practical Earthquake Legislation	
3	[1]	Overview and Box Model Construction	
4	[1]	Conceptualization of the Climate System	
5	[1]	Laws of Thermodynamics, Electromagnetic Radiation	
6	[1]	Energy and Mass Transfers within Earth's Climate System	
7	[1]	Large Scale Atmospheric and Ocean Circulation	
8	[1]	Global Warming/Cooling, Modeling the Climate System	Midterm
9	[1]	Overview of the Carbon Cycle	
10	[1]	Dynamic instability and earthquake cycles	
11	[1]	Spring-slider model	
12	[1]	Linear dynamical systems	
13	[1]	Nonlinear dynamical systems	
14	[1]	Energy Systems	
15			Final

Recommended Sources

1. Bezuijen A., Vastenburg E.W. (Eds.) Geosystems. Design Rules and Applications. CRC Press, Taylor & Francis Group, 2013. XVIII, 145 p

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Special Operation in Drilling
Course Unit Code	OGEN 5007
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	İPF-B17.1, İPF-B17.2
Recommended Optional Program Components	

Course description:
Underbalanced drilling, Horizontal, Extended Reach, Multi-Lateral Drilling, Fishing Operations, Geothermal Drilling, High Pressure High Temperature Drilling.

Objectives of the Course:

Provides students with an introduction to advanced drilling topics such as well control, underbalanced drilling, modern drilling technologies, designer wells, geothermal well drilling and fishing operations. Additionally this course offers the opportunity to learn about team work and distance learning communication

Topics Covered:

1. Introduction to class, review of important topics of previous courses
2. Advanced drilling technology Topics: Managed pressure drilling, dual gradient drilling, special well control issues.
3. Mechanized drilling operations: makeup of tubular, mechanized drilling rigs.
4. Drilling Problems: stuck pipe situations, fishing operation
5. Underbalanced Drilling- Introduction to UBD, UBD techniques, benefits of UBD equipment, selecting an appropriate candidate, and UBD well engineering.
6. Advanced drilling technologies – casing drilling, HPHT, Multilateral Drilling Operations
7. Non-conventional drilling methods and equipment
8. Geothermal Drilling

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4

3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2], [3]	Introduction to class, review of important topics of previous courses	
2	[1], [2], [5]	Advanced drilling technology Topics: Managed pressure drilling.	
3	[1], [2], [5]	Advanced drilling technology Topics: Dual gradient drilling	
4	[1], [2], [5]	Advanced drilling technology Topics: Special well control issues	
5	[1], [2], [3]	Mechanized drilling operations: makeup of tubular, mechanized drilling rigs.	
6	[1], [2], [3]	Drilling Problems: Stuck pipe situations	
7	[1], [2], [3]	Drilling Problems: Fishing operation	
8	[1], [2], [3]	Underbalanced Drilling- Introduction to UBD	Midterm
9	[1], [2], [3]	UBD techniques and equipment	
10	[1], [2], [3]	UBD well engineering.	
11	[1], [2], [5]	Introduction to casing drilling	
12	[1], [2], [4]	HPHT and Geothermal Drilling	
13	[1], [2], [5]	Multilateral Drilling Operations	
14	[1], [2], [5]	Non-conventional drilling methods and equipment	
15			Final

Recommended Sources

1. Chin W.C. Managed Pressure Drilling: Modeling, Strategy and Planning. 1st Edition. — Gulf Professional Publishing, Elsevier, 2012. 408 p.

2. Lyons William. Working Guide to Drilling Equipment and Operations. Gulf Professional Publishing, 2010. — 602 p.

3. Gao Changhong. Petroleum Drilling Technology. Science Press, 2017. - 160 p.

4. Watson A. Geothermal Engineering: Fundamentals and Applications. Springer-Verlag, New York, 2013, 336 p

5. Hill A.D., Zhu Ding, Economides Michael J. Multilateral Wells. Society of Petroleum Engineers, 2008. — 200 p.

6. Azar J., Samuel R. Drilling Engineering. PennWell Corp. 2007. — 491 p.

Assessment

Attendance		

Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Well Test Analysis
Course Unit Code	OGEN 5008
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	Phd. Yelena Shmoncheva
Name of Lecturer (s)	Phd. Yelena Shmoncheva
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	İPF-B17.1, İPF-B17.2
Recommended Optional Program Components	

Course description:
Oil and gas production rates from a well often undergo a declining behavior over time. Well productivity is a complex process that is a function of the hydrocarbon reservoir subsurface properties related to the fluids in places and the hosting environment. It is also related to the wellbore flow conditions from the reservoir to the surface. Well testing is an important technology that is frequently used in the industry. This technology consists of flow diagnostics (rates and pressure) to evaluate a well productivity or injectivity performance such as skin factor, non-Darcy effect, and storativity. It is also used to acquire insights about the reservoir properties such as connectivity, heterogeneity including fractures, flow regime, and drainage area. This course covers the fundamentals of well testing and discusses real field applications. The course includes : 1) fundamentals of flow in porous media; 2) introduction to decline-curve analysis; 3) Buildup-test analysis of slightly compressible fluids; 4) Analysis of oil and gas well flow and buildups tests; 5) Well-test in hydraulically fractured wells; 6) Well-test in naturally fractured reservoirs; 7) Interference and pulse testing; 8) well testing in unconventional reservoirs.

Objectives of the Course:

After completing this course, students will be able to :

- **Understand the well testing technology and its significance**
- **Understand the concept of decline curve analysis**
- **Know about the pressure and rate transient analyses**
- **Understand the capability of well testing in identifying well flow issues and reservoir properties**
- **Understand how this technology can be used to identify flow regimes including fractured reservoirs**
- **Get familiarized with a reservoir simulator**

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Improve reading, writing and presentation skills.	1
2	Prepare a project.	1, 2,3
3	Write an academic essay.	2,3,4
4	Gain team-work opportunities.	1, 2
5	Use the discourse patterns and structures in different essay types that they need for real life.	2, 3
6	To use power-point for presenting the written projects.	2,3,4
7	the written projects will be presented by the students	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3

2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction to well testing	
2	[1]	Fundamentals of fluid flow in porous media.	
3	[1]	Decline curve analysis	
4	[1]	Diffusivity equation: derivation	
5	[1]	Diffusivity equation: solution	
6	[1]	Flow tests: overview	
7	[1]	Flow tests: analysis	
8	[1], [2], [3]	Limitations of real applications	Midterm
9	[1], [2], [3]	Pressure buildup test: phase redistribution	
10	[1], [2], [3]	Well testing in hydraulicly fractured wells	
11	[1], [2], [3]	Well testing in naturally fractured reservoirs	
12	[1], [2], [3]	Injection-well testing	
13	[1], [2], [3]	Interference and pulse testing	
14	[1], [2], [3]	Well testing in unconventional reservoirs	
15			Final

Recommended Sources

1. Well Test Analysis. Manual. — Edinburgh: Heriot-Watt Institute of Petroleum Engineering, 2013. - 648 p.

2. Stewart G. Well Test Design and Analysis (Part 1). Penn Well Corporation, 2011. 1545 p

3. Stewart G. Well Test Design and Analysis (Part 2). Penn Well Corporation, 2011. 1545 p.

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Natural Gas Reservoir Engineering
Course Unit Code	OGEN 5002
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	
Course Coordinator	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	-
Recommended Optional Program Components	Students are expected to have at least basic familiarity with: reservoir engineering

Course description:

- This course is prepared to gain high knowledge about Gas and Gas-Condensate Reservoir Engineering discipline. Reservoir analysis is the main concern of the course. The course combines theoretical foundations with practical applications.

Objectives of the Course:

The main objectives of the course are to:

- Familiarize students with the fundamental principles and governing laws associated with natural gas reservoir engineering
- Transfer knowledge on the behavior and important properties of natural gas
- Provide knowledge and expertise on contemporary practices and methodologies used in natural gas reservoir engineering
- Develop and discuss numerical models and techniques used for the characterization of gas flow in wellbores and reservoirs
- Describe techniques for gas well testing and performance evaluation of the well
- Discuss models and techniques used for volumetric estimation of gas in-place and recoverable hydrocarbons from gas reservoirs
- Discuss techniques used for performance evaluation of gas reservoirs
- Description of natural depletion and the development of gas-condensate reservoirs by gas injection

Learning Outcomes

After completion of the course students will be able to:

- Use current techniques and methodologies for the effective simulation and characterization of gas reservoirs
- Perform calculations for the characterization of gas flow in wellbores and gas reservoirs based on measured rock and gas properties
- Apply techniques for volumetric estimation of gas in-place and recoverable hydrocarbons from gas reservoirs
- Use techniques for gas well testing and performance evaluation of gas wells
- Apply techniques to solve transient gas flow problems in gas reservoirs
- Apply techniques such as natural depletion and gas injection for the development of gas-condensate reservoirs

At the end of the course the student should be able to		Assessment
1	Acquire knowledge on natural gas reservoir engineering with emphasis on science and engineering problems.	1
2	Develop designs and conduct experiments.	1, 2,3
3	Analyze, and evaluate data using computer software.	2,3,4

4	Employ techniques, skills, and the modern engineering tools necessary for engineering practice.	1, 2

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Discussion

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction to natural gas and gas reservoir engineering	
2	[1]	Reservoir properties (rock types, porosity, viscous flow and inertial flow resistance, capillary pressure, etc.)	
3	[1]	Gas properties (composition, compressibility, condensate/gas ratio, viscosity, etc.)	
4	[1]	Phase behavior of gas	
5	[1]	Recoverable reserves (bulk volume, pore volume, etc.)	
6	[1]	Material balance	
7	[1]	Single-phase gas flow (steady-state Darcy flow, steady-state radial flow, transient flow, linear flow, etc.)	
8	[1]	Gas well testing (drawdown tests, buildup tests, etc.)	Midterm
9	[1]	Wellbore flow mechanics	
10	[1]	Water coning	
11	[1]	Natural depletion	
12	[1]	Gas injection	
13	[1]	Special Problems in Gas Reservoir Engineering	
14	[1]	Hydrate Control & Pipeline Cleaning	
15			Final

Recommended Sources

1. **Dr. Boyun Guo and Ali Ghalambor Natural Gas Engineering Handbook, 2nd Edition, 2005**

Assessment		
Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Natural Gas Reservoir Engineering
Course Unit Code	OGEN 5003
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	
Course Coordinator	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	-
Recommended Optional Program Components	Students are expected to have at least basic familiarity with: production engineering

Course description:

- The course is designed for graduate students. Hence, understanding of basic concepts is assumed a priori. Some similar topics will be covered but with the deep analysis in order to guide students for the future research directions. Advanced project involving wide range of computation will be provided during the semester and will be related to fluid flow in the whole system. Quizzes will be provided during the classes and are based on the topic covered previously.

Objectives of the Course:

Identify the options available for oil and gas field development. And identify the major components of the production system. Understand and apply the theory behind Reservoir Well Facility flow modeling.

Learning Outcomes

After completion of the course students will be able to:

- Apply worldwide experience to certain well performance problems
- Apply fundamental sciences in well performance management
- Deliver scientific ideas to production system
- Analyze current research directions locally and worldwide
- Design an advanced production system and apply various optimization techniques
- Model a completion design for various types of reservoir and compute perforation parameters
- Describe the options with constrains and advantages for producing from multiple production zones
- Understand reservoir and well integrity specifics in details
- Calculate parameters related to artificial lift systems
- Perform high order computations using programming languages
- Identify the crucial near wellbore area susceptible to formation damage.
- Calculate the cost of formation damage (in terms of lost production).
- Provide guidelines for minimizing formation damage during workover operations.
- Explain the potential negative impacts of “matrix stimulation” and identify migration strategies

At the end of the course the student should be able to		Assessment
1	Acquire knowledge on natural gas production engineering with emphasis on science and engineering problems.	1
2	Develop designs and conduct experiments.	1, 2,3
3	Analyze, and evaluate data using computer software.	2,3,4
4	Employ techniques, skills, and the modern engineering tools necessary for engineering practice.	1, 2

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Discussion		
Course's Contribution to Program		
		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Introduction to natural gas production engineering	
2	[1], [2]	Properties of Natural Gas	
3	[1], [2]	Material Balance Analysis	
4	[1], [2]	Basic Equation, Volumetric Expansion	
5	[1], [2]	Presence of Water Influx	
6	[1], [2]	Inflow Performance	
7	[1], [2]	Near Well Bore Alterations	
8	[1], [2]	Water Coning	Midterm
9	[1], [3]	Perforations, Gravel Pack, Frac-Pack Completions	
10	[1], [3]	Flow through Pipes and Restrictions	
11	[1], [3]	System Performance	
12	[1], [2]	Gas Compression	
13	[1], [3]	Evaluation of Compressors	
14	[1], [3]	Gas Metering	
15			Final

Recommended Sources

1. **Kelkar, Mohan. Natural gas production engineering / Mohan Kelkar. 2008**
2. **Well Completion Design, Jonathan Bellarby,2009**
3. **Production Technology, Heriot Watt university manual, 2013**

Assessment		
Attendance		

Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Statistics & Probability for Petroleum Engineers
Course Unit Code	OGEN 5004
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	Calculus II
Recommended Optional Program Components	Students are expected to have at least basic familiarity with: reservoir engineering and calculus.

Course description:
This is the subject accompanying Pressure Control.
Porous sedimentary formations penetrated by the rock bit contain fluids such as oil, gas or salt water. If the hydrostatic pressure of the drilling fluid drops below the formation pore pressure, pore fluid will enter the well and "kick" the mud out of the well. To control the pressure while drilling you need to understand the behavior of gas. This course aims at explaining the physics and the engineering approaches behind pressures in the sediments, detection of unstable wellbores, equipments necessary to close and kill the well, killing methods and offshore challenges.

Objectives of the Course:

The main objectives of the course are to:

- Familiarize students with the fundamental concepts of probability and statistics.
- Develop an understanding of the role of statistics with emphasis on engineering applications.
- Provide an understanding of the processes by which real-life statistical engineering and science problems are analyzed.
- Acquaint students with computer-based statistical analysis.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Acquire knowledge on statistics and probability theory with emphasis on science and engineering problems.	1
2	Develop designs and conduct experiments.	1, 2,3
3	Analyze, and evaluate statistical data using computer software.	2,3,4
4	Employ techniques, skills, and the modern engineering tools necessary for engineering practice.	1, 2

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Discussion

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	4
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5

4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	2
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	1
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Sampling and Descriptive Statistics	
2	[1], [2]	Probability	
3	[1], [2]	Random Variables	
4	[1], [2]	Propagation of Error	
5	[1], [2]	Commonly Used Distributions	
6	[1], [2]	Confidence Intervals	
7	[1], [2]	Hypothesis Testing	
8	[1], [2]	Correlation and Simple Linear Regression	Midterm
9	[1], [2]	Multiple Regression	
10	[1], [2]	Factorial Experiments	
11	[1], [2]	Randomized Complete Block Designs	
12	[1], [2]	Control Charts for Variables	
13	[1], [2]	Control Charts for Attributes	
14	[1], [2]	Process Capability	
15			Final

Recommended Sources

1. **Navidi W. Statistics for Engineers and Scientists. NY: McGraw-Hill, 2011.**
2. **Jay L. Devore Probability and Statistics for Engineering and the Sciences Duxbury Press-2016**
3. **Richard L. Scheaffer, Madhuri Mulekar and James T. McClave Probability and Statistics for Engineers Cengage Learning 2010**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Reservoir Characterization
Course Unit Code	OGEN 5009
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	
Semester when the course unit is delivered	
Course Coordinator	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	-
Recommended Optional Program Components	Students are expected to have at least basic familiarity with: reservoir engineering

Course description:

Principles and protocols for measuring fluid content, porosity, bulk volume, bulk density, particle density, particle size distribution, surface area, permeability, pore size distribution, porosimetry, capillary pressure, water retention curve, relative permeability, imbibition, computed tomography scanning, focused ion beam–scanning electron microscopy, diffusion (liquid and gas), and hydrocarbon production decline behavior. These measurements are widely used to characterize oil and gas reservoirs.

Objectives of the Course:

- Identification of heterogeneity in oil reservoirs by conventional methods and possible improvements of these methods.
- Basic statistical concepts and methods to be watched. Evaluation of Reservoir Rocks and Fluid Properties by Statistical Methods.
- Preparing Scaler and Simulator Data. New Methods in the Characterization of Oil Reservoirs.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Acquire knowledge on formation and liquid properties determination with emphasis on science and engineering problems.	1
2	Develop designs and conduct experiments.	1, 2,3
3	Analyze, and evaluate data using computer software.	2,3,4
4	Employ techniques, skills, and the modern engineering tools necessary for engineering practice.	1, 2

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Discussion

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3
2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5

4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	4
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1], [2]	Preamble to Petroleum Reservoir Rock Properties	
2	[1], [2]	Porosity	
3	[1], [2]	Absolute Permeability	
4	[1], [2]	Mechanical and Electrical Properties of Reservoir Rocks.	
5	[1], [2]	Fluid Saturation	
6	[1], [2]	Interfacial Tension and Wettability	
7	[1], [2]	Capillary Pressure	
8	[1], [2]	Relative Permeability	Midterm
9	[3]	Introduction to Petroleum Reservoir Fluids	
10	[3]	Introduction to Phase Behavior	
11	[3]	Sampling of Petroleum Reservoir Fluids	
12	[3]	Compositional Analysis of Petroleum Reservoir Fluids	
13	[3]	PVT Analysis and Reservoir Fluid Properties	
14	[3]	Vapor–Liquid Equilibria	
15			Final

Recommended Sources

1. **Dandekar, A.Y. 2013. Petroleum Reservoir Rock and Fluid Properties. 2nd Edition, CRC Press, 544 pp**
2. **Darvin V. Ellis, Julian M. Singer, Well Logging for Earth Scientists, 2008**
3. **George Asquith and Daniel Krygowski,(second edition), Basic Well Log Analysis, 2006**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment
Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam

Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**

Oil and gas engineering (OGEN) program, Oil and Gas Production Faculty BS program, Oil & Gas Engineering Department

Course Unit Title	Mathematical Modeling of Hydrocarbon Reservoirs
Course Unit Code	OGEN 5014
Type of Course Unit	Elective
Level of Course Unit	4th year BSc program
National Credits	6
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	4
Semester when the course unit is delivered	7
Course Coordinator	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Face to face teaching and midterm project (oral and written)
Prerequisites	MATH2101, MATH 2202
Recommended Optional Program Components	Students are expected to have at least basic familiarity with: calculus, single and multi-phase flow in porous media, reservoir engineering

Course description:
The course is designed for graduate students. Understanding of advanced reservoir engineering concepts is strongly required along with mathematical concepts including solution of ordinary and partially differential equations (ODE and PDE). Coding skills is expected from students for project implementation.

Objectives of the Course:

The objectives are to improve analytical thinking and develop numerical computational skills regarding reservoir simulation and build own reservoir simulator.
Implementation includes analysis of advanced reservoir engineering concepts, investigation of ODEs and PDEs used in reservoir simulation, linear algebra, and numerical solution techniques. The key objective is understanding of commercial software and duplication of simple models. Case studies will be investigated which includes various EOR techniques.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	To apply reservoir engineering concepts for numerical simulation	1
2	To manage input data for Eclipse and Eclipse 300	1, 2,3
3	To treat Parabolic and Hyperbolic equations	2,3,4
4	To work with spatial and temporal discretization	1, 2
5	To implement Cartesian grids construction	2, 3
6	To solve tridiagonal matrix equations	2,3,4
7	To analyse Simultaneous and Implicit Pressure Explicit Saturation solution	2,3,4

Assessment Methods: 1. Written Exam, 2.Midterm, 3.Assignment, 4. Project/Report, 5. Presentation, 6. Lab. Work

Course's Contribution to Program

		CL
1	Ability to apply and deeply understand mathematical, technical and natural disciplines.	3

2	The ability to conduct a deep analysis of the problem, aimed at identifying the necessary requirements and methods for solving it.	4
3	The ability to combine knowledge of the mathematical foundations, algorithms and methods of the hydrocarbon field development process in reservoir modelling and reservoir system design.	5
4	According to the knowledge and skills acquired during the training, develop innovative processes and components for systems that meet modern requirements from an economic, environmental and social point of view.	3
5	Ability to interpret data, obtained as a result of planning and conducting various kinds of research and experiments, as well as the ability to predict the further development of the system.	4
6	Ability to apply the skills and knowledge of engineering when working in a multidisciplinary team.	1
7	Constant and continuous self-development and learning for a long time.	2
8	Apply knowledge of information technology and oil and gas to propose appropriate solutions to oil and gas operations.	5
9	Critically apply the essential tools available for finding and characterizing hydrocarbon accumulations using formation evaluation techniques.	3
10	Ability to demonstrate detailed knowledge and application of operational and technical activities involved in exploration and production.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]	Introduction	
2	[1]	fracturing, Stress Distribution, Vertical Versus Horizontal Fractures, Pressure Related to Fracturing	
3	[1]	Closure Pressure, Fracturing Pressure –Decline analysis	
4	[1]	Pressure Interpretation After Closure, Properties of Fracturing Fluids	
5	[1]	Proppants, Propped Fracture Design, Fracture Propagation Model, Width Equations	
6	[1]	Material Balance	
7	[1]	Detailed Models. Evaluation of Fracture Design	
8	[1]	Acid Fracturing	Midterm
9	[1]	Acid Systems and Placement Techniques	
10	[1]	Fracturing of Deviated and Horizontal Wells	
11	[1]	Matrix Stimulations	
12	[1]	Matrix Acidizing Design	
13	[1]	Rate and Pressure Limits for Matrix Treatment	
14	[1]	Fluid Volume Requirements	
15			Final

Recommended Sources

1. **Standard Handbook of Petroleum and Natural Gas Engineering. 2nd Edition. William C Lyons, Gary C Plisga.**

Assessment

Attendance		
Midterm I	5%	Written Exam
Project	20%	Both oral presentation and written assignment

Midterm Exam	25%	Written Exam
Final Exam	50%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Azerbaijan State Oil and Industry University Academic Regulations for Undergraduate Studies

Course Policies

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer
- Cheating and plagiarism will not be tolerated. .

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class	14	3	42
Presentation	1	14	14
Tutorials	14	1	14
Self-study	14	5	70
Midterm Examinations	1	3	3
Preparation for midterm exams	7	1	7
Final Examination	1	3	3
Preparation for final exam	14	1	14
Total Workload			**167**
Total Workload/30(h)			**≈ 5.56**
ECTS Credit of the Course			**6**