Department of "Natural sciences".

MODULE HANDBOOK

BSc in BIOLOGY

MODULE HANDBOOK-General Subjects

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**History of Azerbaijan**
Course Unit Code	**ÜF-B01**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Ph.D. Gunel Rahimli Ashraf
Name of Lecturer (s)	Ph.D. Gunel Rahimli Ashraf
Name of Assistant (s)	-
Mode of Delivery	-
Language of Instruction	Azeirbaijan, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

1. This subject teaches actual problems, main stages, important events, political, military, ideological, cultural, demographic and ethnic processes of the history of Azerbaijan in the context of the general history of the Eastern world and the Caucasus.
2. By making comparisons and parallels, students are formed the ability to correctly analyze the historical events that happened in different periods and draw logical conclusions.

Objectives of the Course: During the course of study, the history and culture of Azerbaijan, domestic and foreign policy, relations with other countries, etc. will be considered.
This handbook provides essential information including expected learning, subject content and assessment details during the course. You should read carefully and follow closely during the subject.

Learning Outcomes

- Communicate effectively in both oral and written form in Azerbaijani, and demonstrate professional communication skills in at least one foreign language related to the biological sciences.
- Apply information technologies effectively for data collection, processing, analysis, and presentation in biological research and practice.
- Demonstrate a deep understanding of the foundations of Azerbaijani statehood and its role in the global scientific and cultural context.
- Plan, manage, and complete professional tasks efficiently using time management skills and strategic decision-making.
- Collaborate effectively in multidisciplinary teams, showing responsibility, leadership, and a team-oriented approach to problem-solving.

- Adapt to new environments and demonstrate initiative, creativity, and resilience in dynamic scientific or work-related settings.
- Evaluate, select, and use scientific information from primary literature and credible sources to support arguments, research, or decisions.
- Critically analyze and synthesize data using quantitative, laboratory, field-based, and/or computational biological methods.
- Explain the relationships among structure, function, and biological processes at different levels of organization: molecular, cellular, organismal, population, community, and ecosystem.
- Describe genetic information flow and the mechanisms of evolution, including natural selection and the origin and conservation of biodiversity.
- Design and conduct scientific experiments, interpret results, and apply evidence-based reasoning to biological questions or hypotheses.
- Demonstrate ethical scientific conduct, civic responsibility, and environmental awareness, recognizing the broader social, historical, and cultural impacts of science.

At the end of the course the student will be able to		Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction and scientific results to students	
2	FTN2 Demonstrate logical and consistent knowledge	
3	FTN3 Write a research paper on the topic in accordance with the methods of scientific research	
4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	

8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Azerbaijan in prehistory time	
2		Ancient states in azerbaijan. Manna, atropatena, ancient albania	
3		Azerbaijan in the iii-vii centures	
4		Azerbaijan under the arab caliphate	
5		Azerbaijan in the 9th to the early 13rd centuries	
6		Azerbaijan in the 14th century to 15th centures	
7		Azerbaijan safavid state	
8		Khanates of azerbaijan	
9		Azerbaijan in the xix centures	
10		Azerbaijan in the first decades of the 1900s	
11		Azerbaijan democratic republic (1918-1920)	
12		Azerbaijan in the 1920-1930s	
13		Azerbaijan during the world war i and after the war	
14		Indepent Azerbaijan Republic (1991- 2020s.)	
15		The second Garabagh war and the victory of Azerbaijan	

Recommended Sources

1.History of Azerbaijan. Red. M.Abdullayev. Baku, 2015, 2019 412 p.
2. The History of the Caucasian Albanians" by Movses Khorenatsi (translated by R. W. Thomson)
3. Azərbaycan tarixi üzrə qaynaqlar.S.S.Əliyarov və Y.M.Mahmudovun redaktəsi ilə. Bakı,Çıraq, 2007.400 p. 4. The Politics of Culture in Soviet Azerbaijan, 1920-40, Audrey Altstadt, Published January 12, 2018 by Routledge
5. The Azerbaijani Turks: Power and Identity under Russian Rule, Audrey Altstadt, Publisher 19 Hoover Institution Press;92

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "English Language Centre".

Course Unit Title	**Business and Academic Communication in a Foreign Language-1**
Course Unit Code	**ÜF-B02.01**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	4
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2

Course Coordinator	
Name of Lecturer (s)	Jala Asgarova
Name of Assistant (s)	Jala Asgarova
Mode of Delivery	-
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

This course has been designed to provide you, whose first language is not English, with the opportunity to obtain an appropriate level in the English language. The course offers progression for students who seek to develop and enhance their skills in reading, writing, speaking and listening in English. It helps students expand their outlook, enrich vocabulary stock, express their ideas in English effectively. It also focuses on reading comprehension, vocabulary development, effective academic writing and improving speaking skills.

Objectives of the Course: The aims of the course are:

- expand skills in reading, writing, listening and speaking in English
- enrich understanding of how language works
- enhance confidence in interacting with others in a variety of contexts using the English language
- increase linguistic knowledge of specific aspects of work or study in contexts where English is the center of communication
- read and understand texts will meet in your degree studies

Learning Outcomes. The student will grow in their ability to use English to communicate effectively with others in all disciplines.

While listening, the student will be able to understand phrases and the highest frequency vocabulary related to areas of personal relevance such as very basic personal and family information, shopping, local area, employment. The student will be able to understand the main point in short, clear, simple messages and announcements.

While reading, the student will be able to understand very short, simple texts. They will be able to find specific, predictable information in simple everyday material such as advertisements, menus and timetables. They will be able to read short simple personal letters.

When writing, the student will be able to produce short, simple notes and messages that relate to matters of immediate concern. They will be able to write a simple personal letter such as a thank-you letter.

When speaking, the student will be able to produce a series of phrases and sentences to describe in simple terms things like his/her family, other people, living conditions, educational background or a present or previous job.

At the end of the course the student will be able to		Assessment
1	Use appropriate vocabulary and expressions for effective business communication in a foreign language	
2	Write formal emails, reports, and academic essays in a foreign language with correct grammar and style.	
3	**Participate confidently in academic discussions, presentations, and debates in a foreign language.**	

4	Conduct professional negotiations and meetings using culturally appropriate language and etiquette.	
5	Understand and analyze academic texts and business documents written in a foreign language.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Unit 1. Marketing-Reading 1;Reading skill; Work with the video	
2		Unit 1. Marketing-Reading 2; Critical Thinking Strategy; Vocabulary Skill	
3		Unit 1. Marketing-Writing skill; Grammar:Present Continuous; Unit assignment	
4		Unit 1. Business and Marketing: Note-taking Skill, Listening 1; Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	

5		Unit 1. Business and Marketing: Grammar:The present continuous; Pronounciation; Speaking skill; Unit Assignment	
6		Unit 2. Psychology -Reading 1;Reading skill; Work with the video	
7		Unit 2. Psychology -Reading 2; Critical Thinking Strategy; Vocabulary Skill	
8		Unit 2. Psychology-Writing skill; Grammar:Future with will ; Unit assignment	
9		Unit 2. Psychology: Listening 1; Note-taking Skill Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
10		Unit 2. Psychology: Speaking skill; Grammar: There is and it is; Pronounciation; Unit Assignment	
11		Unit 3. Social Psychology -Reading 1;Reading skill; Work with the video	
12		Unit 3. Social Psychology -Reading 2; Vocabulary Skill	
13		Unit 3. Social Psychology-Writing skill; Grammar:Subject-verb agreement; Unit assignment; Critical Thinking Strategy;	
14		Unit 3. Social Psychology: Listening 1; Note-taking Skill, Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
15		Unit 3 . Social Psychology: Speaking skill, Grammar:Modal verbs should and shouldn`t; Pronounciation;; Unit Assignment	
16		Practice: Handling Complaints&Problem Solving	
17		Practice: Asking for & giving directions	
18		Review (Units 1-3)	
19		Achievement – 1	
20		Unit 4. Technology -Reading 1;Reading skill; Work with the video	
21		Unit 4. Technology -Reading 2; Vocabulary Skill	
22		Unit 4. Technology-Writing skill; Grammar: Modals; Unit assignment; Critical Thinking Strategy;	
23		Unit 4. Technology: Listening 1; Note-taking Skill, Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
24		Unit 4 . Technology: Speaking skill; Grammar:Comparatives; Pronounciation; Unit Assignment	
25		Unit 5. Business-Reading 1;Reading skill; Work with the video	
26		Unit 5. Business -Reading 2; Vocabulary Skill	
27		Unit 5. Business-Writing skill; Grammar:Comparative and Superlative adjectives; Unit assignment; Critical Thinking Strategy;	
28		Unit 5. Sociology: Listening 1; Note-taking Skill, Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
29		Unit 5 . Sociology: Speaking skill;Grammar:Auxiliary verbs in	

		questions; Pronounciation; Unit Assignment	
30		Unit 6. Brain Science-Reading 1;Reading skill; Work with the video	
31		Unit 6. Brain Science -Reading 2; Critical Thinking Strategy; Vocabulary Skill	
32		Unit 6. Brain Science-Writing skill; Grammar:Infinitives of purpose; Unit assignment	
33		Unit 6. Behavioral Science: Listening 1; Note-taking Skill,; Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
34		Unit 6. Behavioral Science: Speaking skill Grammar:Imperative verbs; Pronounciation;Unit Assignment	
35		Practice: Social media & Digital Communication	
36		Practice: Learning from Tv shows&movies	
37		Review (Units 4-6)	
38		Achievement – 2	
39		Unit 7. Environmental Science-Reading 1;Reading skill; Work with the video	
40		Unit 7. Environmental Science -Reading 2; Critical Thinking Strategy; Vocabulary Skill	
41		Unit 7. Environmental Science -Writing skill; Grammar: Simple Past and Past continuous; Unit assignment	
42		Unit 7. Environmental Science: Listening 1; Note-taking Skill, Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
43		Unit 7. Environmental Science: Speaking skill; Grammar: Future with will; Pronounciation; Unit Assignment	
44		Unit 8. Public Health-Reading 1;Reading skill; Work with the video	
45		Unit 8. Public Health -Reading 2; Critical Thinking Strategy; Vocabulary Skill	
46		Unit 8. Public Health -Writing skill; Grammar Adverbs of manner and degree; Unit assignment	
47		Unit 8. Public Health : Listening 1; Note-taking Skill, Listening Skill, Critical Thinking Strategy; Listening 2; Work with the video; Vocabulary Skill	
48		Unit 8. Public Health: Speaking skill; Grammar: If clauses for future possibility; Pronounciation; Unit Assignment	
49		Practice: Storytelling&Fluency development	
50		Practice: Modern English & Everyday expressions	
51		Review (units 7-8)	
52		Achievement – 3	
53		Preperation for final	
Recommended Sources			

1. Q: Skills for Success (Reading and Writing) Level 2: Third Edition / Joe McVeigh/ Jennifer Bixby / Oxford University Press, 2020
2. Q: Skills for Success (Listening and Speaking) Level : Third Edition / Margaret Brooks / Oxford University Press, 2020

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**210**
Total Workload/30(h)			**210\30**
ECTS Credit of the Course			**7**

MODULE HANDBOOK

Bachelor program in biology, Department of "Azerbaijani language and literature".

Course Unit Title	**Academic and business communication in Azerbaijani-2**
Course Unit Code	**ÜF-B03**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Alasgarova Solmaz Hashim
Name of Lecturer (s)	Alasgarova Solmaz Hashim
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Within the framework of this subject, special attention should be paid to instilling in students the skills of making presentations in Azerbaijani, public speaking, and academic and business writing.

Objectives of the Course:

The subject "Business and Academic Communication in the Azerbaijani Language" emerged based on a certain need and demand. In the conditions of globalization, it is necessary to know its phonetic, lexical and grammatical rules and norms in depth and apply them correctly to written and oral speech in order to use the Azerbaijani language correctly and fluently in accordance with the requirements of the time, as well as to prepare a smooth speech in this language regardless of specialization, and to convey ideas flawlessly. The subject is taught in the form of practical exercises.

Learning Outcomes

- **Demonstrate proficiency in academic and professional Azerbaijani language** in both written and oral forms.
- **Analyze and apply the stylistic norms** of scientific, official, and business communication.
- **Construct clear, coherent, and grammatically correct documents** such as reports, proposals, emails, and essays.
- **Communicate effectively in formal, academic, and professional contexts** using appropriate tone, vocabulary, and structure.
- **Interpret and critique academic texts**, business letters, and professional reports

At the end of the course the student will be able to		Assessment
1	At the end of the course, students will acquire basic knowledge about the subject.	
2	The role of auxiliary parts of speech in the academic communication process. Oral and written communication, accuracy, clarity, fluency of speech and other basic requirements.	
3	Study of communicative rhetoric and styles of literary language. Communicativeness, communication strategies and creative technologies.	
4	Listening culture and attention skills. Speech etiquette, address etiquette and the peculiarities of organized speech	
5	Modern business style, the role of letters and the language of official documents. Compliance with spelling rules and business rhetoric.	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani language in the specialty	
2	Communication skills in at least one foreign language in the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state	
4	Ability to identify threats and challenges facing our nation-state;	
5	Ability to use information technology in the workplace;	
6	Ways of collecting and storing data, ability to create a database	
7	Ability to work in a team and achieve a common approach to problem solving;	
8	Ability to adapt to new circumstances, take initiative, and have the will to succeed	
9	Ability to identify and select additional information resources to solve problems;	
10	Skills to analyze, summarize, and apply relevant information for professional purposes;	
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1		Information about the subject. Goals and objectives of the subject. Language and speech. Information about the language. Azerbaijani language. Decisions, decrees and laws on the Azerbaijani state language.	
2		Speech culture and the art of oratory. The relationship of the art of oratory with other sciences.	
3		Forms of speech. Written speech and oral speech. Differences	

		between written speech and oral speech. Features of oral speech. Improving oral speech skills.	
4		Communication. Business communication culture.	
5		Discussion and listening culture. Ethical issues of speech. Speech etiquette.	
6		Expressive actions that complement oral speech. Body language. Mimicry, gesture.	
7		Literary language. Norms of literary language. Phonetic norm. Expectation of orthographic norms in academic and business communication. Abbreviations. Punctuation marks	
8		Expectation of orthoepic norms in academic and business communication. Expressiveness of speech. Stress, intonation.	
9		Lexical norm. Expectation of lexical norm in academic and business communication. Use of terms, synonyms, idioms, etc.	
10		Grammatical norm. Expectation of grammatical norms in academic and business communication. Inversion. Use of descriptive and expressive means of language in academic speech (ellipsis, rhetorical questions, exclamation, etc.).	
11		Auxiliary parts of speech, their stylistic possibilities in speech.	
12		Types of speech: dialogical speech, monological speech, polylogical speech.	
13		Basic requirements for cultural speech.	
14		Style and stylistics. Functional styles of the Azerbaijani language.	
15		Scientific style. Rules for written and oral presentation of lectures, scientific papers, essays, scientific reports, summaries, etc.	

Recommended Sources TEXTBOOK(S)
"Scientific-Business Communication" – [Author: E.E.Eliyev / E.Q.Eliyeva]

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**240**
Total Workload/30(h)			**240\30**
ECTS Credit of the Course			**8**

MODULE HANDBOOK

Bachelor program in Biology, Department of "English Language Centre".

Course Unit Title	**3.Business and Academic Communication in a Foreign Language-2**
Course Unit Code	**ÜF-B02.02**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	
Practice (hour/week)	
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Jala Asgarova
Name of Lecturer (s)	Jala Asgarova
Name of Assistant (s)	-
Mode of Delivery	-
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: This course has been designed to provide you, whose first language is not English, with the	

opportunity to obtain an appropriate level in the English language. The course offers progression for students who seek to develop and enhance their skills in reading, writing, speaking and listening in English. It helps students expand their outlook, enrich vocabulary stock, express their ideas in English effectively. It also focuses on reading comprehension, vocabulary development, effective academic writing and improving speaking skills.

Objectives of the Course: The aims of the course are:
- expand skills in reading, writing, listening and speaking in English
- enrich understanding of how language works
- enhance confidence in interacting with others in a variety of contexts using the English language
- increase linguistic knowledge of specific aspects of work or study in contexts where English is the center of communication
- read and understand texts will meet in your degree studies

Learning Outcomes: The student will grow in their ability to use English to communicate effectively with others in all disciplines.
While listening, the student will be able to understand phrases and the highest frequency vocabulary related to areas of personal relevance such as very basic personal and family information, shopping, local area, employment. The student will be able to understand the main point in short, clear, simple messages and announcements.
While reading, the student will be able to understand very short, simple texts. They will be able to find specific, predictable information in simple everyday material such as advertisements, menus and timetables. They will be able to read short simple personal letters.
When writing, the student will be able to produce short, simple notes and messages that relate to matters of immediate concern. They will be able to write a simple personal letter such as a thank-you letter.
When speaking, the student will be able to produce a series of phrases and sentences to describe in simple terms things like his/her family, other people, living conditions, educational background or a present or previous job.

At the end of the course the student will be able to		Assessment
1	Use appropriate vocabulary and expressions for effective business communication in a foreign language	
2	Write formal emails, reports, and academic essays in a foreign language with correct grammar and style.	
3	**Participate confidently in academic discussions, presentations, and debates in a foreign language.**	
4	Conduct professional negotiations and meetings using culturally appropriate language and etiquette.	
5	Understand and analyze academic texts and business documents written in a foreign language.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	

3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		**Unit 1. Sociology. How do you make a good first impression?** Reading 1: Small talk. Reading Skill: Main ideas and supporting details	
2		**Unit 1. Sociology. How do you make a good first impression?** Reading 2: 21st Century job interviews. Critical Thinking Strategy: A causal chain.	
3		**Unit 1. Sociology. How do you make a good first impression?** Work with the video: Advice on a good first impression Vocabulary skill: Using the dictionary	
4		**Unit 1. Sociology. How do you make a good first impression?** Writing skill: Organizing and developing a paragraph Grammar: Real conditionals. Present and future	
5		**Unit 1. Sociology. Are first impression accurate?** Note-taking Skill: to summarize a lecture Listening 1: The psychology of first impressions.	
6		**Unit 1. Sociology. Are first impression accurate?** Listening Skill: Listening for main ideas. Listening 2: A review of books about first impression.	
7		**Unit 1. Sociology. Are first impression accurate?** Work with the video: Interview mistakes. Vocabulary skill: suffixes.	

		Grammar: Auxiliary verbs: do, be, have	
8		**Unit 1. Sociology. Are first impression accurate?** Pronounciation: Contractions with helping verbs	
9		**Unit 2**. **Nutritional science. What makes food attractive?** Reading 1: Knowing your taste. Reading skill: previewing a text	
10		**Unit 2**. **Nutritional science. What makes food attractive?** Reading 2: Eating with our eyes. Critical thinking strategy: Making inferences	
11		**Unit 2**. **Nutritional science. What makes food attractive?** Vocabulary skill: Using content to understant words.	
12		**Unit 2**. **Nutritional science. What makes food attractive?** Writing skill: Writing descriptive adjectives. Grammar: Use and placement of adjectives	
13		**Unit 2**. **Nutritional science. Why do we change the foods we eat?** Listening 1: A billion pounds of spices	
14		**Unit 2**. **Nutritional science. Why do we change the foods we eat?** Critical Thinking Strategy : predicting topics and ideas Listening 2: A world of food	
15		**Unit 2**. **Nutritional science. Why do we change the foods we eat?** Grammar: Quantifiers with count and noncount nouns	
16		**Unit 2**. **Nutritional science. Why do we change the foods we eat?** Pronunciation: links with [j]and [w] Speaking skill: Giving advice	
17		**Unit 3. Information technology. How has technology affected our lives?** Reading 1: Cars that think Reading Skill: taking notes	
18		**Unit 3. Information technology. How has technology affected our lives?** Reading 2: Classrooms without walls	
19		**Unit 3. Information technology. How has technology affected our lives?** Vocabulary skill: Synonyms Writing skill: Writing a summary and personal response	
20		**Unit 3. Information technology. How has technology affected our lives?** Grammar: Parallel structure	
21		**Unit 3. Psychology. In what ways is change good or bad?** Listening 1:Shaped by change, promoting change. Listening skill: Listening for time markers	
22		**Unit 3. Psychology. In what ways is change good or bad?**	

		Critical thinking Strategy: summarizing information Listening 2: An interview with Barbara Ehrenreich	
23		**Unit 3. Psychology. In what ways is change good or bad?** Vocabulary skill: a word web Grammar: Tag questions.	
24		**Unit 3. Psychology. In what ways is change good or bad?** Pronounciation: Intonation in tag questions Speaking skill: Asking for and giving reasons	
25		**Unit 4. Marketing. Does advertising help or harm us?** Reading 1: Can targeted ads change you?	
26		**Unit 4. Marketing. Does advertising help or harm us?** Reading 2: In defence of advertising. Work with the Video: How algorithms changed the world?	
27		**Unit 4. Marketing. Does advertising help or harm us?** Vocabulary skill: Synonyms Writing skill: An opinion essay	
28		**Unit 4. Marketing. Does advertising help or harm us?** Grammar: Compound sentences	
29		**Unit 4. Marketing. How does advertising affect our behaviour?** Note-taking skill: A mind map to note opinions Listening 1: Targeting children with advertising	
30		**Unit 4. Marketing. How does advertising affect our behaviour?** Listening skill: Fact and opinion Listening 2: The influence of online ads	
31		**Unit 4. Marketing. How does advertising affect our behaviour?** Vocabulary skill: Context clues to identify meaning Grammar: Modals expressing attitude	
32		**Unit 4. Marketing. How does advertising affect our behaviour?** Pronouncition: intonation in questions Speaking skill: Giving and supporting your opinions	
33		**Unit 5. Psychology. How do people overcome obstacles?** Reading 1: How people learn to become resilient. Reading skill: Referents to understand contrast.	
34		**Unit 5. Psychology. How do people overcome obstacles?** Reading 2: The climb of my life. Work with the video: Shona regains her confidence	
35		**Unit 5. Psychology. How do people overcome obstacles?** Vocabulary skill: Using the dictionary to find the correct meaning.	
36		**Unit 5. Psychology. How do people overcome obstacles?** Writing skill: Writing a narrative essay. Grammar: Shift between past and present time frames.	

37		**Unit 5**. **Behavioral science. Does taking risks change our lives?** Listening 1: A lifetime of risks	
38		**Unit 5**. **Behavioral science. Does taking risks change our lives?** Listening Skill: listening for different kinds of numbers Listening 2: Science on the edge.	
39		**Unit 5**. **Behavioral science. Does taking risks change our lives?** Vocabulary skill: word families Grammar: Past perfect	
40		**Unit 5**. **Behavioral science. Does taking risks change our lives?** Speaking skill: Giving a short presentation	
41		**Unit 6**. **Neurology. Are you a good decision maker?** Reading 1: The lazy brain. Reading Skill: using a graphic organizer	
42		**Unit 6**. **Neurology. Are you a good decision maker?** Reading 2: Problem-solvers.	
43		**Unit 6**. **Neurology. Are you a good decision maker?** Vocabulary skill: phrasal verbs Writing skill: stating reasons and giving examples	
44		**Unit 6**. **Neurology. Are you a good decision maker?** Grammar: Gerunds and infinitives	
45		**Unit 6. Neurology. Will AI ever be as smart as humans?** Listening skill: inferring a speaker's attitude Listening 1: What kind of smart is AI?	
46		**Unit 6. Neurology. Will AI ever be as smart as humans?** Listening 2: Asking the right questions about AI	
47		**Unit 6. Neurology. Will AI ever be as smart as humans?** Vocabulary skill: Using the dictonary Grammar: Gerunds and infinitivesas the objects of verbs	
48		**Unit 6. Neurology. Will AI ever be as smart as humans?** Speaking skill: Leading a group discussion.	
49		**Unit 7. Economics. Can a business earn money while making a difference**? Reading 1: FEED project. Reading skill: using a timeline	
50		**Unit 7. Economics. Can a business earn money while making a difference**? Reading 2: A new business models. Vocabulary skill: collocations with verbs	
51		**Unit 7. Economics. Can a business earn money while making a difference**? Grammar: Complex sentences Writing skill: Writing a cause/ effect essay	

52		**Unit 7. Economics. Can money buy happiness?** Listening 1: Sudden wealth Critical thinking Strategy: choosing two or more options	
53		**Unit 7. Economics. Can money buy happiness?** Listening 2: Happiness breeds success Vocabulary skill: idioms Grammar: Types of sentences	
54		**Unit 7. Economics. Can money buy happiness?** Pronounciation: intonation in different types of sentences Speaking skill: agreeing and disagreeing	
55		**Unit 8. Behavioral studies. What does it take to be successful?** Reading 1: Fast cars, big money Reading skill: scanning a text	
56		**Unit 8. Behavioral studies. What does it take to be successful?** Reading 2: Practice makes ... pains. Vocabulary skill: collocations with adjectives+preposions	
57		**Unit 8. Behavioral studies. What does it take to be successful?** Writing skill: Writing an argumentative essay Grammar: Sentence fragments	
58		**Unit 8. Behavioral studies. What can we learn from success and failure?** Listening 1: Learning from failure Listening skill: listening for examples	
59		**Unit 8. Behavioral studies. What can we learn from success and failure?** Listening 2: An interview with Mohannad Abu-dayyah Vocabulary skill: prefixes Grammar: Simple past and present perfect	
60		**Unit 8. Behavioral studies. What can we learn from success and failure?** Pronounciation: Varying intonation to maintain interest Speaking skill: Asking for and giving clarification	

Recommended Sources

1. 1. Q: Skills for Success (Reading and Writing) Level 3: Third Edition / Colin S.Ward/ Margot F.Gramer/ Oxford University Press, 2020
2. Q: Skills for Success (Listening and Speaking) Level 3: Third Edition / Miles Craven / Oxford University Press,2020

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU			
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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**240**
Total Workload/30(h)			**240\30**
ECTS Credit of the Course			**8**

MODULE HANDBOOK- General Electives

Bachelor program in Biology, Department of "Philosophy".

Course Unit Title	**Philosophy**
Course Unit Code	**ÜFS-B04**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Gunel Mustafayeva
Name of Lecturer (s)	Gunel Mustafayeva
Name of Assistant (s)	-
Mode of Delivery	Full Time

Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
Philosophy is a scientific worldview about nature, society, and man. Based on scientific knowledge, philosophy forms a generalized worldview about nature, society, and man in man and helps to provide a logical analysis of existence.

Objectives of the Course: By providing students with spiritual knowledge about nature, society, and humanity, it aims to form a scientific and philosophical worldview in them, and to form logical thinking so that they can understand and analyze the world.

Learning Outcomes

- To form modern approaches to the study of natural and social phenomena, the ability to collect and analyze empirical data, the rules for compiling scientific work, and the ability to summarize and analyze research results.

	At the end of the course the student will be able to	Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction and scientific results to students	
2	FTN2 Demonstrate logical and consistent knowledge	
3	FTN3 Write a research paper on the topic in accordance with the methods of scientific research	
4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	

5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction to the course. The subject of philosophy and the main areas of philosophy	
2		Basic philosophical concepts: being, human personality (part I)	
3		Basic philosophical concepts: being, human personality (part II)	
4		Approaches to the existence of "soul, mind" in philosophy	
5		The problem of "free will" in philosophy.	
6		Communication Theories. Logical Fallacies in Argumentation (Part I)	
7		Communication Theories. Logical Fallacies in Argumentation (Part II)	
8		Political Philosophy (Introduction): discussion of key concepts	
9		Economics and Philosophy	
10		Philosophy and the Concept of Justice	
11		Philosophy and the Concept of Justice	
12		Consciousness, brain and computers (artificial intelligence)	
13		Philosophy and the meaning of life: philosophical practices in our daily lives	
14		Philosophy and environmental problems	
15		Time and space in philosophy	

Recommended Sources

1) Arendt Hannah, “Human Condition”, The University of Chicago Press, Chicago & London, 2d edition, 1998.
2) Arendt Hannah, “The origins of totalitarianism”, A Harvest Book Harcourt Brace & Company, San Diego NY London, 1979.
3) Becker Gary S., “Human Capital: A THEORETICAL AND EMPIRICAL ANALYSIS, WITH SPECIAL REFERENCE TO EDUCATION”, The University of Chicago Press Ltd., London, 1993.
4) Aristotle, Politics.
5) Beebee, Helen, Free Will: An Introduction, Palgrave, 2013.
6) Cassin Barbara, “Dictionary of Untranslatables: A Philosophical Lexicon”, Prinston University Press 2014.
7) Craig Edward, “Philosophy: A very short Introduction”, Oxford University Press Inc., New York 2002
8) Eco Umberto, “Eternal Fascism: Fourteen Ways of Looking at a Blackshirt “Writing in New York Review of Books, 22 June 1995, pp.12-15.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)

Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**
Total Workload/30(h)			**90\30**
ECTS Credit of the Course			**3**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Philosophy".

Course Unit Title	**Introduction to multiculturalism**
Course Unit Code	**ÜFS-B04**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Elvin Khudaverdiyev
Name of Lecturer (s)	Elvin Khudaverdiyev
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	

Introduction to Multiculturalism is a course that explores the coexistence and interaction of different cultures, ethnic groups, and social identities. It introduces students to the values, customs, and worldviews of different cultures, while also exploring the social, political, and economic aspects of multiculturalism.		
Objectives of the Course: The aim of the course Introduction to Multiculturalism is to understand the interrelationships of different cultures and ethnic groups, to appreciate the value of cultural diversity, and to promote social harmony. This course teaches students the principles of multiculturalism, intercultural communication, and integration processes, as well as discussing issues of social justice, equality, and human rights. As a result, students acquire the knowledge and skills that will contribute to the development of positive relations between different cultures.		
Learning Outcomes: The outcomes of the Introduction to Multiculturalism course include understanding cultures, increasing empathy and respect, developing tolerance, increasing social knowledge, strengthening communication skills, promoting integration and social harmony, and developing critical thinking skills.		
At the end of the course the student will be able to		Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction and scientific results to students	
2	FTN2 Demonstrate logical and consistent knowledge	
3	FTN3 Write a research paper on the topic in accordance with the methods of scientific research	
4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	

8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		The subject and importance of Introduction to Multiculturalism	
2		Religious diversity. The essence of religion and its forms of manifestation	
3		World religions	
4		National Religions	
5		Ethnic diversity and the national idea	
6		Multiculturalism as an effective policy model for regulating ethnic-cultural diversity	
7		Ethno-cultural diversity and its regulation in modern Western countries	
8		Multiculturalism in Azerbaijan in modern times	

Here is the English translation of the bibliography:

1. **Quliyev, R. (2015).** *Fundamentals of Multiculturalism.*
2. **Khudaverdiyev, Elvin.** *Azerbaijan's Multiculturalism Policy (2023)*
3. **Mammadov, A. (2018).** *Multiculturalism in Azerbaijani Society.*
4. **Aliyeva, S. (2020).** *Cultural Diversity and Social Harmony.*
5. Kymlicka, W. (1995). Multicultural Citizenship: A Liberal Theory of Minority Rights.
6. Taylor, C. (1992). Multiculturalism and the Politics of Recognition.
7. Parekh, B. (2000). Rethinking Multiculturalism: Cultural Diversity and Political Theory.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations				
ECTS allocated based on Student Workload				
Activities		Number	Duration (hour)	Total Workload(hour)
Course duration in class				
Presentation				
Self-study				
Tutorials				
Midterm Examination				
Preparation for midterm exam				
Final Examination				
Preparation for final exam				
Total Workload				**90**
Total Workload/30(h)				**90\30**
ECTS Credit of the Course				**3**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Psychology and social work".

Course Unit Title	**Sociology**
Course Unit Code	**ÜFS-B04**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Gasimov Azer
Name of Lecturer (s)	Gasimov Azer
Name of Assistant (s)	-
Mode of Delivery	-
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-
Course description:	

Welcome to the Sociology course, one of the elective subjects of the bachelor's degree you are taking. The main objective of this subject is to provide students with fundamental knowledge about the structure of society, social institutions, social changes and the study of human behavior in a social context. The subject of Sociology teaches students to analyze social phenomena with a scientific approach, understand the relationships between different layers of society and develop analytical thinking skills to investigate social problems.
In addition, the course aims to equip students with social theories, empirical research methods and concepts that are essential for investigating the impact of social structures on individuals and groups. As a result, students develop a deeper understanding of how society works and the ability to propose solutions to social problems.

Objectives of the Course: Sociology is a field of study that encompasses the study of social structure, social institutions, social change, and human behavior in a social context. This subject teaches students to analyze social phenomena with a scientific approach and gain a deeper understanding of the events that occur in society.

Learning Outcomes: -Students who successfully complete this subject will have the following knowledge and skills:

Knowledge:

- Will be able to explain the basic concepts, theoretical directions and research methods of sociology.
- Will analyze the functions of social institutions (family, education, religion, economy, politics) and their impact on society.
- Will be able to explain the processes of social stratification, social mobility and social change.
- Will understand the causes and consequences of social problems (gender inequality, poverty, ethnic and racial relations, crime, etc.).
- Will acquire information about globalization, urbanization and modern social trends.

Skills:

- Will develop the ability to analyze social phenomena and processes with a scientific approach.
- Will be able to conduct empirical research using social research methods (surveys, interviews, observation, etc.).
- Will approach social problems critically and develop analytical thinking skills to solve them.
- They will analyze the relationships between social groups and individuals and evaluate the functioning of social institutions.
- They will be able to apply the theoretical knowledge they have acquired in social policy, business, media and other fields.

These training outcomes will ensure that students master sociological knowledge, develop scientific thinking and research skills, understand the social processes of society and analyze them and present solutions.

At the end of the course the student will be able to		Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction and scientific results to students	
2	FTN2 Demonstrate logical and consistent knowledge	
3	FTN3 Write a research paper on the topic in accordance with the	

	methods of scientific research	
4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

1	Oral and written communication skills in Azerbaijani relevant to the specialty;	CL
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Sociology as a science	
2		Society as a complex social phenomenon	
3		Personality as a social system	
4		The concept of social structure	
5		Sociology of social ethnic relations	
6		Social territorial associations	
7		Religion and sociology	
8		Education and sociology	

Recommended Sources

1. Giddens, A. (2009). Sociology. Polity Press.

2. Macionis, J. J. (2018). Sociology. Pearson.
3. Ritzer, G. (2021). Sociological Theory. McGraw-Hill.
4. Haralambos, M., & Holborn, M. (2013). Sociology: Themes and Perspectives. Collins.
5. Berger, P. L., & Luckmann, T. (1966). The Social Construction of Reality: A Treatise in the Sociology of Knowledge. Penguin Books.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**
Total Workload/30(h)			**90\30**
ECTS Credit of the Course			**3**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Philosophy".

Course Unit Title	**Constitution of the Republic of Azerbaijan and the foundations of law**
Course Unit Code	**ÜFS-B04**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Arzu Hajiyeva
Name of Lecturer (s)	Arzu Hajiyeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The course covers the concept, structure, stages of development of the constitution, the concept and content of human and civil rights and freedoms, as well as the concept of law, and the stages of formation of the legal system in Azerbaijan.

Objectives of the Course: The main goal is to teach students the basics of the Constitution, including the basics of law. Acquiring and mastering the necessary knowledge is one of the important conditions.

Learning Outcomes

-To study in depth the Constitution of the Republic of Azerbaijan and to gain excellent knowledge about human and civil rights and freedoms.

At the end of the course the student will be able to		Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction and scientific results to students	
2	FTN2 Demonstrate logical and consistent knowledge	
3	FTN3 Write a research paper on the topic in accordance with the methods of scientific research	

4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Concept, structure and stages of development of the Constitution of the Republic of Azerbaijan	
2		Constitutional and legal status of man and citizen in the Republic of Azerbaijan.	
3		State power and local self-government of the Republic of Azerbaijan.	
4		The concept, essence and sources of the legal system of the Republic of Azerbaijan.	
5		The system of law and areas of law.	
6		Legal norms and legal relations.	
7		Legal facts, violations of law and legal liability.	

8		Areas of law: fundamentals of constitutional, administrative and criminal law.	

Recommended Sources

1. **The Constitution of the Republic of Azerbaijan**
2. **S.S. Allahverdiyev.** *Fundamentals of the Constitution and Law of the Republic of Azerbaijan.* Textbook. Baku, 2012
3. **Ed. V.V. Lazarev.** *General Theory of Law and State.* Baku, 2007

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**
Total Workload/30(h)			**90\30**
ECTS Credit of the Course			**3**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Philosophy".

Course Unit Title	**Logic**
Course Unit Code	**ÜFS-B04**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Gunel Mustafayeva
Name of Lecturer (s)	Gunel Mustafayeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The course offers students an approach to logic as a branch of philosophy through brain work, language, deductive and inductive logic, the art of reasoning, and classroom discussions. The main focus is on the study of the mechanism of argumentation and expression of ideas. Special attention is paid to logical fallacies. The problems and challenges of the modern era will also be analyzed and discussed.

Objectives of the Course: Students should leave this course with an understanding of the fundamental concepts of logic; demonstrate an understanding of the central questions of logic as a field of philosophy, be familiar with the art of reasoning, and have an idea of the major challenges of the modern age.

Learning Outcomes

- study the content of the subjects and problems of the subject, their main concepts and their use in other philosophical and humanitarian disciplines.
- the student should be able to freely analyze the ideas of philosophical schools and compare them.

At the end of the course the student will be able to		Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction and scientific results to students	
2	FTN2 Demonstrate logical and consistent knowledge	

3	FTN3 Write a research paper on the topic in accordance with the methods of scientific research	
4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction to the course. Logic as a branch of philosophy. Course objectives. The work of the brain	
2		Language, Mind, and Logic. The "Triad" Theory of the Brain.	
3		Logic as a branch of philosophy. Language, Mind, and Logic	
4		Logic and the Language Theories of Ludwig Wittgenstein	
5		Logic and the Language Theories of Ludwig Wittgenstein	
6		Logic and Classification Rules	

7		Logic and Classification Rules	
8		Statement. Syllogism, Conclusions. Analysis of Arguments	
9		Statement. Syllogism, Conclusions. Analysis of Arguments	
10		Formal and Informal Logic	
11		Formal and Informal Logic	
12		Logical errors, ability to ask the right questions	
13		Logical errors, ability to ask the right questions	
14		Logical errors, ability to ask the right questions	
15		Inductive and Deductive Logic	

Recommended Sources

1.The Art of Reasoning, The Introduction to Logic and Critical Thinking, 4th edition, David Kelley, 2014
2.Thinking Fast and Slow, Daniel Kahneman, 2013
3.Logic Primer - 2nd Edition, by Colin Allen, Michael Hand
4.Logic. An Introduction to Elementary Logic - 2nd Edition, by Colin Allen, Michael Hand
5.Philosophy of Logic, 1986, by W. V. Quine

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**

Total Workload/30(h)	**90\30**
ECTS Credit of the Course	**3**

MODULE HANDBOOK

Bachelor program in Biology, Department of "philosophy".

Course Unit Title	**Ethics and aesthetics**
Course Unit Code	**ÜFS-B04**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Gunel Mustafayeva
Name of Lecturer (s)	Gunel Mustafayeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The subject "Ethics" examines the emergence and evolution of ethical teachings throughout history; it allows students to gain knowledge about the main ethical theories that have existed in human history, to form a unified view of the study of ethics in the system of social and philosophical sciences, and to understand the process of interaction between morality and society.

Objectives of the Course: Familiarization with the technology of organizing research, its types, stages, methods and techniques; orientation of the student to conduct research in the experimental process by putting forward and realizing his own hypotheses and concepts, as well as understanding the possibilities of testing them alone or together with his group mates; formation of the ability to review scientific literature for the initial study of the problem

Learning Outcomes

Forms the ability to rationally approach the history of ethical thought; creates a complete picture of modern approaches to the study of ethical knowledge, the essence of morality, and classifies its main functions; emphasizes the importance of maintaining objectivity in the study of the history of ethical thought; applies the acquired theoretical knowledge in professional and everyday activities.

At the end of the course the student will be able to		Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction	

	and scientific results to students	
2	FTN2 Demonstrate logical and consistent knowledge	
3	FTN3 Write a research paper on the topic in accordance with the methods of scientific research	
4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Ethics in the system of philosophical knowledge	
2		The formation of ethical thought. The main stages in the development of ethical teachings	
3		Ethical ideas in the history of public opinion in Azerbaijan	
4		The essence and functions of morality	

5		Main categories of ethics	
6		Moral sense and moral practice	
7		Applied ethics and its scope	
8		Ethical principles in professional activity	

Recommended Sources

1. **Gizilgul Abbasova.** *Ethics: History, Theory and Practice (textbook).* Baku, 2016
2. **Sevinc Shahhuseynova.** *Ethics,* Baku, 2009

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**
Total Workload/30(h)			**90\30**
ECTS Credit of the Course			**3**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Information technologies".

Course Unit Title	**Application of information technologies in biology**
Course Unit Code	**ÜFS-B05**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Ahmadova Esmira
Name of Lecturer (s)	Ahmadova Esmira
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The subject "Application of Information Technologies in Biology" covers the topics of ICT, its application areas, application in biology, computer hardware, computer software, computer networks. Among these topics, "Database", "Spreadsheets", etc. can be mentioned.

Objectives of the Course: The purpose of the subject "Application of Information Technologies in Biology" is to form a worldview, relevant knowledge and skills about information processes, ICT, its characteristics, application in biology, computer hardware and software, text, presentation, spreadsheet, and database creation.

Learning Outcomes

- Formation of ideas about information processes;
- Formation of ideas about information technologies and their application areas;
- Formation of ideas about computer hardware and software;
- Formation of ideas about creating text, presentations, spreadsheets, databases;
- Formation of ideas about computer networks, skills in their use;
- Formation of the ability to use information technologies that are most often used in education and in the specialty.

At the end of the course the student will be able to		Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction and scientific results to students	
2	FTN2 Demonstrate logical and consistent knowledge	

3	FTN3 Write a research paper on the topic in accordance with the methods of scientific research	
4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Information processes and information technologies.	
2		Application areas of information technologies. Information technologies in biology.	
3		Computer hardware. Computer software.	
4		Operating system. Word processor.	
5		Spreadsheets.	
6		Electronic presentations.	
7		Database.	

8		Computer networks. Internet network.	

Recommended Sources

1. **Hajiyeva R.C.** *Informatics. Collection of Lectures*, Publishing and Printing Center of Western Caspian University, Baku, 2020, 180 pages.
2. **Trofimov V. V.** *Informatics. Textbook for Academic Bachelor's Degree. In 2 volumes. Volume 2.* Moscow: Yurayt, 2019. 406 pages.
3. **Filimonova E. V.** *Informatics and Information Technologies in Professional Activities. Textbook.* Moscow: Justitsiya, 2019. 216 pages.
4. **Karimov S.Q., Habibullayev S.B., Ibrahimzada T.I.** *Informatics.* Baku, 2011.
5. **Kaymin V.A.** *Informatics.* Moscow: INFRA-M, 2012.
6. *Databases and Database Management System: Access.*
7. http://tpt.tom.ru/sved/umk/obscheobraz/uchebnik/dbase.htm

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**
Total Workload/30(h)			**90\30**
ECTS Credit of the Course			**3**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Information technologies".

Course Unit Title	**Information management and database creation**
Course Unit Code	**ÜFS-B05**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Ahmadova Esmira
Name of Lecturer (s)	Ahmadova Esmira
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject "Information Management and Database Creation" covers the topics of ICT, its application areas, database organization, and information management. Among these topics, "Database Management System", "Database Organization in MS Access Environment", etc. can be mentioned.

Objectives of the Course: The purpose of the subject "Information Management and Database Creation" is to form a worldview, relevant knowledge and skills about information processes, ICT, its characteristics, application, information management, and database creation.

Learning Outcomes

- Formation of ideas about information processes;
- Formation of ideas about information technologies and their areas of application;
- Formation of ideas about information management;
- Formation of ideas about database management systems and database creation;
- Formation of ideas about spreadsheet organization technologies;
- Formation of ideas about computer networks and skills to use them;
- Formation of the ability to use information technologies that are most often used in education and in the specialty.

At the end of the course the student will be able to		Assessment
1	FTN1 to recognize historians-researchers who play an important role in writing the history of Azerbaijan, to introduce their scientific direction and scientific results to students	

2	FTN2 Demonstrate logical and consistent knowledge	
3	FTN3 Write a research paper on the topic in accordance with the methods of scientific research	
4	FTN4 to connect historical events with modern times, to draw conclusions.	
5	FTN5 to apply the methods of comparative analysis, analysis and synthesis	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Information and information processes. Information management.	
2		Information technologies and their application areas.	
3		Database management system.	
4		Database organization in MS Access environment.	
5		Spreadsheet organization technologies.	
6		Using information resources and services in the Internet	

		environment.	
7		Geographic information systems.	
8		Using other applications.	

Recommended Sources

1. **Hajiyeva R.C.** *Informatics. Collection of Lectures*, Western Caspian University Printing and Publishing Center, Baku, 2020, 180 pages.
2. **Trofimov V. V.** *Informatics. Textbook for Academic Bachelor's Degree. In 2 volumes. Volume 2.* Moscow: Yurayt, 2019. 406 pages.
3. **Filimonova E. V.** *Informatics and Information Technologies in Professional Activities. Textbook.* Moscow: Justitsiya, 2019. 216 pages.
4. **Karimov S.Q., Habibullayev S.B., Ibrahimzada T.I.** *Informatics.* Baku, 2011.
5. **Kaymin V.A.** *Informatics.* Moscow: INFRA-M, 2012.
6. *Databases and Database Management System: Access.* http://tpt.tom.ru/sved/umk/obscheobraz/uchebnik/dbase.htm
7. *What is Data Management?* https://www.oracle.com/cis/database/what-is-data-management/

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**

Total Workload/30(h)	**90\30**
ECTS Credit of the Course	**3**

MODULE HANDBOOK

Bachelor program in biology, department of "Political science ,Psychology and social work".

Course Unit Title	**Political science**
Course Unit Code	**ÜFS-B05**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Rahimov Elxan Rahim
Name of Lecturer (s)	Rahimov Elxan Rahim
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:
"Political science" is the science of politics, political processes and institutions, and political power. The main task of political science, which reflects the diversity and diversity of the political life of society, is to provide objective, scientifically based information about political phenomena and processes and to use this information for the benefit of social development. The course consists of theoretical and seminar (practical) lessons.

Objectives of the Course:
The teaching of this subject sets the following goals:
-the main goal of the course is to help students develop a general understanding of modern political knowledge;
-the main teaching tools are lectures, exercises, demonstration of presentations, class discussions, expert reports, team projects, role-playing games, analysis and criticism of various political works, including articles taken from magazines and websites.
-before each lesson, the student must read the specified texts and all other assigned reading materials

Learning Outcomes
- A successful student will have fully mastered the basic concepts of politics at the end of the course
- The ability to analyze empirical and normative approaches will be developed
- Familiarity with various political doctrines will help them form a broad and systematic political worldview.

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

1	A successful student will have fully mastered the key political concepts by the end of the course.	
2	They will have developed the ability to analyze empirical and normative approaches.	
3	Familiarity with various political ideologies will help them form a broad and systematic political worldview	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Knowledge about politics Stages of development of political science	
2		Concept of State • Definition of State • Social Contract Role and Power of the State	
3		Political ideologies Political power	
4		Democracy • Concept of Democracy Forms of Democracy	
5		Foreign policy • The concept of foreign policy Functions of foreign policy	
6		International Relations • What is International Relations? • Theories of International Relations	

		Main Stages in the Development of International Relations Theory	
7		Global Governance • What is Globalization? • What is Global Governance? Global Media and the Public Dilemma	
8		Game Theory Political Conflict and Security	

Recommended Sources

TEXTBOOK(S)

1. Afandiyəv, M. (1998). Problems of Political Science. Baku
2. Hüseynov, R. (2017). Political Science. Baku
3. Şirəliyev H., Əhmədov Ə. (1997). Political Science. Baku
4. Şiraliyev H. (1998). Political Science. Baku
5. Teymurlu, M. (2014). Political Science. Baku
6. Azerbaijan State University of Economics (2004). Political Science (Textbook). Baku
7. Vasilik M. A. (ed.) (2001). Political Science. Moscow: Gardariki.
8. Pugachev V.P., Solovyov A.I. (1998). Introduction to Political Science. Moscow: Aspect Press.
9. Heywood, A. (2013). Politics. 4th ed. New York: Palgrave Macmillan.
10. Ranney, Austin (1996). Governing: An Introduction to Political Science. New Jersey: Prentice-Hall.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			

Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**
Total Workload/30(h)			**90\30**
ECTS Credit of the Course			**3**

MODULE HANDBOOK- Major

Bachelor program in Biology, Department of "Mechanics and Mathematics".

Course Unit Title	**Mathematics and biostatistics for biological sciences**
Course Unit Code	**İF-BO1**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Svetlana Guliyeva
Name of Lecturer (s)	Svetlana Guliyeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azeirbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: It is noted what students will know, what they will achieve and what skills they will acquire by studying this subject.) This subject is composed of elements of selected sections from various fields of mathematics: linear algebra, analytical geometry, mathematical analysis, differential equations, probability theory and mathematical statistics. Students who receive a bachelor's degree in the specialty "Biology" must be able to use mathematical methods. Graduates of this specialty are engaged in research and scientific-practical work in various fields of biology, justifying their judgments and proving the regularity of the results.	
Objectives of the Course: The aim of the course is to provide students with knowledge about the main sections of mathematical methods.	

1. Operations of the oil and gas industry across the value chain
2. Relationships and interactions between industry players
3. Importance of oil and gas in the economy
4. Likely future scenarios for the industry

Learning Outcomes: The main aim of the subject taught is to assist students in their independent work and to increase the effectiveness of mastering the subject.

At the end of the course the student will be able to		Assessment
1	The aim of the course is to teach students the methods of important branches of mathematics that can be applied to biological science.	
2	The student will gain the skills to use mathematical methods in their research related to biological science.	
3	understanding mathematical modeling in biology	
4	Experience in investigating the most common ordinary differential equations in models	
5	to build and analyze mathematical models of some biological processes in scientific research	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in the Azerbaijani language relevant to the specialty	
2	Communication skills in at least one foreign language related to the specialty	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; ability to forecast the future development of the national state	
4	Ability to identify the threats and challenges facing the national state	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to create databases	
7	Ability to work in a team and to achieve collaborative solutions to problems	
8	Ability to adapt to new conditions, take initiative, and maintain the determination to succeed	
9	Ability to identify and select additional information resources for problem-solving	
10	Skills to analyze, summarize, and apply relevant information for professional purposes	

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

Course Contents

Week	Chapter	Topics	Exam

1		Determinants of order two and three and their basic properties. Systems of linear algebraic equations with two and three unknowns. Cramer's rule.	
2		The concept of a function and basic methods of representation. Basic elementary functions and their graphs.	
3		Limit of a function and its properties. One-sided limits and some existence conditions of limits. Two notable limits (without proof).	
4		Continuity of a function and main properties of continuous functions. Classification of discontinuities. Problems leading to the concept of a derivative; general definition of a derivative. Geometric and physical meaning of the derivative. Relationship between continuity and differentiability of a function.	
5		Derivatives of some simple functions. Basic differentiation rules. Formulas for the derivative of composite and inverse functions. Derivatives of logarithmic, exponential, power, and inverse trigonometric functions.	
6		Rolle's and Lagrange's theorems. Conditions for increasing and decreasing behavior of functions; extrema of a function; necessary condition for extremum at a point; sufficient condition for existence of extremum.	
7		Concavity and convexity of function graphs, inflection point. Scheme for constructing the graph of a function.	
8		Differential of a function: definition, geometric interpretation, and relationship between differential and increment of a function. Properties of differentials.	
9		Concepts of primitive functions and indefinite integrals, and their basic properties. Table of basic integrals.	
10		Main methods for calculating indefinite integrals (direct integration, substitution, and integration by parts). Definition and geometric meaning of definite integrals. Basic properties of definite integrals. Definite integrals with a variable upper limit. Newton-Leibniz formula.	
11		Main methods for calculating definite integrals (substitution and integration by parts). Applications of definite integrals (calculation of areas and volumes of solids of revolution).	
12		General concepts of differential equations; concepts of general and particular solutions. Cauchy problem. Separable and separable-variable differential equations.	
13		First-order linear differential equations. Second-order linear differential equations. General solution of second-order homogeneous linear differential equations with constant coefficients.	
14		Elements of probability theory.	
15		Elements of mathematical statistics.	
Recommended Sources TEXTBOOK(S)			

1. **"Biostatistics: A Foundation for Analysis in the Health Sciences"**
   By Wayne W. Daniel & Chad L. Cross (11th Edition)

2. **"Mathematics for the Life Sciences"**
   By Erin N. Bodine, Suzanne Lenhart, & Louis J. Gross

3. **"Principles of Biostatistics"**
   By Marcello Pagano & Kimberlee Gauvreau (2nd Edition).
4. **"Introductory Biostatistics"**
   By Chap T. Le (2nd Edition)

5. **"The Analysis of Biological Data"**
   By Michael C. Whitlock & Dolph Schluter (2nd or 3rd Edition)

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Physics".

Course Unit Title	**Physics**
Course Unit Code	**İF-BO2**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	1
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Ilham Salimov
Name of Lecturer (s)	Ilham Salimov
Name of Assistant (s)	-
Mode of Delivery	Lection, Laboratory
Language of Instruction	Azerbaijani
Prerequisites	-
Recommended Optional Program Components	-

Course description: To form relevant knowledge, skills and habits in students, to ensure that they conduct physical experiments, analyze the results and analyze the data obtained.

Objectives of the Course: To instill in students the principles of electromagnetism, optics, atomic and nuclear physics. Throughout the course, to familiarize students with visual aids and engage them in practical work. To explore the relevance of physics to everyday life and its applications in various fields.

5. Operations of the oil and gas industry across the value chain
6. Relationships and interactions between industry players
7. Importance of oil and gas in the economy
8. Likely future scenarios for the industry

Learning Outcomes

- Communicate effectively in both oral and written form in Azerbaijani, and demonstrate professional communication skills in at least one foreign language related to the biological sciences.
- Apply information technologies effectively for data collection, processing, analysis, and presentation in biological research and practice.
- Demonstrate a deep understanding of the foundations of Azerbaijani statehood and its role in the global scientific and cultural context.
- Plan, manage, and complete professional tasks efficiently using time management skills and strategic decision-making.
- Collaborate effectively in multidisciplinary teams, showing responsibility, leadership, and a team-oriented approach to problem-solving.

- Adapt to new environments and demonstrate initiative, creativity, and resilience in dynamic scientific or work-related settings. - Evaluate, select, and use scientific information from primary literature and credible sources to support arguments, research, or decisions. -		
At the end of the course the student will be able to		Assessment
1	- Critically analyze and synthesize data using quantitative, laboratory, field-based, and/or computational biological methods. -	
2	- Explain the relationships among structure, function, and biological processes at different levels of organization: molecular, cellular, organismal, population, community, and ecosystem.	
3	- Describe genetic information flow and the mechanisms of evolution, including natural selection and the origin and conservation of biodiversity.	
4	- Design and conduct scientific experiments, interpret results, and apply evidence-based reasoning to biological questions or hypotheses.	
5	- Demonstrate ethical scientific conduct, civic responsibility, and environmental awareness, recognizing the broader social, historical, and cultural impacts of science.	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in the Azerbaijani language related to their specialty;	
2	Communication skills in at least one foreign language related to their specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the prospective development of our national state;	
4	The ability to identify the threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to create a database;	
7	The ability to work in a team and to achieve a collaborative approach to problem-solving	
8	The ability to adapt to new conditions, take initiative, and maintain the determination to succeed;	
9	The ability to identify and select additional information resources for problem-solving;	
10	The skills to analyze, synthesize, and apply relevant information for	

	professional purposes.		
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
Course Contents			
Week	Chapter	Topics	Exam
1		Vectors and operations on them. Vector and scalar quantities. System of units and measurement of physical quantities. Mechanical motion. Rectilinear motion of a material point and equations of motion. Acceleration, uniformly accelerating and uniformly decelerating motion.	
2		Curvilinear motion along a circle, characterizing quantities - acceleration, angular and linear velocity. Dynamics. Inertial calculation systems. Newton's I and II laws. Concept of force and mass. Weight of an object, gravitational force. Weightlessness. Newton's -III law. Gravitational force. Law of universal gravitation. Gravitational constant	
3		Curvilinear motion along a circle, characterizing quantities - acceleration, angular and linear velocity. Dynamics. Inertial calculation systems. Newton's I and II laws. Concept of force and mass. Weight of an object, gravitational force. Weightlessness. Newton's -III law. Gravitational force. Law of universal gravitation. Gravitational constant	
4		Molecular kinetic concept. Basic provisions of molecular kinetic theory and their experimental confirmation. Ideal gases. Isoprocesses. Equation of state of an ideal gas, graphs. Dance motion. Mathematical and spring dancers. Period of dance. Harmonic dances. Equations of harmonic dance. Mechanical waves and their types. Wavelength. Interference of waves.	
5		Stationary flow of liquids. Continuity equation. Bernoulli's equation and its consequences. Viscosity of liquids and gases. Flow of liquids in a pipe. Poiseuille's formula.	
6		Laminar and turbulent flow regime. Reynolds number. Movement of a solid in liquids and gases. Stokes' formula. Characteristics of the liquid state. Properties of the surface layer of a liquid. Surface energy. Surface tension. Wetting phenomenon. Laplace's formula	
7		Electrostatics. Electric charge, their mutual influence force. Coulomb's law. Electric field intensity. Intensity vector flux. Potential difference. Dielectrics. Dielectrics in an electric field. Polarization of dielectrics. Electric capacity, units. Capacitors. Energy of a capacitor, series and parallel connection	
8		Dynamic electric current. Conditions for the formation of current Ohm's law for a circuit part. Resistance of wires. Specific resistance. Series and parallel connection of wires. Coulomb-Lens law. Ohm's law for a complete circuit, E.H.Q	
9		Structure and properties of solids. Theory of zones. Electric	

		current in gases. Non-independent and independent discharges. Types of non-independent discharges. The phenomenon of thermoelectron emission.	
10		Electric current in semiconductors. Types of electrical conductivity of semiconductors, specific and additive conductivity. Semiconductor diode, transistors Electric current in liquids. Electrolytic dissociation. Faraday's laws for electrolysis.	
11		Magnetic field and its characteristics Interaction of current-carrying wires. Magnetic induction of the field. Magnetic field of a wire with current. Ampere's law. "Left-hand" rule.	
12		Motion of charged particles in a magnetic field. Lorentz force Magnetic flux. Electromagnetic induction phenomenon. Induction current. Self-induction phenomenon, inductance. Lenz's rule	
13		Alternating electric current. Ohm's law for an alternating current circuit. Transformers, principle of operation. Distribution and transmission of electrical energy over long distances.	
14		Elements of geometric optics. Thin lens, Linzal's formula. Optical power of a lens Diopter. Linear magnification of a lens. Wave properties of light. Interference of light. Coherence	
15		Structure of the atom. Thomson's model of the atom. Rutherford experiment. Planetary model of the atom. Bohr theory. Bohr postulates, its shortcomings. Stationary states.	
16		Lab 1: Introduction to laboratory work. Understanding of errors. Determination of the acceleration of gravity using a mathematical dancer	
17		Lab 2: Coulomb potential and Coulomb field of metal surfaces, Determination of the charge of a sphere. Calculation of the force of interaction between charged particles	
18		Lab 3: Determination of capacitance in a capacitor, dielectric permittivity of the medium.	

Recommended
Sources
TEXTBOOK(S)

1. **"University Physics"** by Hugh D. Young and Roger A. Freedman
2. **"Fundamentals of Physics"** by David Halliday, Robert Resnick, and Jearl Walker

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria Final grades are determined according to the Academic Regulations of WCU			
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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Chemistry".

Course Unit Title	**Chemistry**
Course Unit Code	**İF-BO3**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	1
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Karimova-Cafarova Ulviyya Nizami
Name of Lecturer (s)	Karimova-Cafarova Ülviyya Nizami
Name of Assistant (s)	-
Mode of Delivery	Visual, Laboratory

Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description: The course begins with information about the application of chemistry in our lives and covers topics such as chemical systems, polymers and oligomers, chemical thermodynamics and kinetics, the distribution of non-metals and metals in nature, their production, properties and their properties, analysis methods, classification of organic compounds by class, their reactivity, the nature of environmental problems caused by organic compounds, and the diversity of biomolecules that make up living organisms.

Objectives of the Course: To teach the fundamentals of chemistry and to develop an understanding of its application in life. One of the goals of the course is to help students increase their knowledge of chemistry, develop critical thinking and problem-solving skills by working with examples and cases. Another goal of the course is to give students experience with concepts used in science such as observation, logic, analysis, objectivity, accuracy and fluent communication.

9. Operations of the oil and gas industry across the value chain
10. Relationships and interactions between industry players
11. Importance of oil and gas in the economy
12. Likely future scenarios for the industry

Learning Outcomes: Formation of ideas about the goals and objectives of chemistry, scientific research methods, and its relationship with other sciences;

At the end of the course the student will be able to		Assessment
1	Forming ideas about chemical experiments;	
2	- Formation of ideas about the means of teaching;	
3	- - Formation of ideas about pedagogical principles and teaching methods;	
4	- Formation of ideas about the content of the chemistry course among students.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani within the field of specialization;	
2	Communication skills in at least one foreign language within the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the prospective development of our national state;	
4	Ability to identify the threats and challenges facing the national state	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to create databases	
7	Ability to work in a team and to achieve collaborative solutions to problems	
8	Ability to adapt to new conditions, take initiative, and maintain the	

	determination to succeed	
9	Ability to identify and select additional information resources for problem-solving	
10	Skills to analyze, summarize, and apply relevant information for professional purposes	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction. Basic concepts of chemistry. Stoichiometric laws	
2		Models of atomic structure. Periodic law and periodic system of elements.	
3		Characteristics of chemical bonding. Complex compounds.	
4		Energetics of chemical processes. Chemical kinetics.	
5		Solutions. Electrolyte solutions.	
6		Oxidation-reduction reactions.	
7		Chemistry of metals.	
8		Chemistry of metals. Continued.	
9		Chemistry of non-metals.	
10		Chemistry of non-metals. Continued.	
11		Hydrocarbons.	
12		Derivatives of hydrocarbons	
13		Organic polymeric materials.	
14		Elements of chemical analysis.	
15		Chemistry and ecology.	
16		Lab 1: Determination of the Concentration of an Electrolyte Solution Using Conductometry	
17		Lab 2: Redox Titration: Determination of Iron (II) in Solution Using Potassium Permanganate	
18		Lab 3: Preparation and Identification of a Polymer (e.g., Nylon or Polyvinyl Acetate)	

Recommended
Sources
TEXTBOOK(S)

1. *Theodore L. Brown, H. Eugene LeMay, Bruce E. Bursten və Catherine Murphy t*- "Kimya: Mərkəzi Elm"
2. *David W. Oxtoby, H. Pat Gillis və Laurie J. Butler* -"Müasir Kimyanın Prinsipləri"
3. *Ralph H. Petrucci, F. Geoffrey Herring, Jeffry D. Madura və Carey Bissonnette* - "Ümumi Kimya: Prinsiplər və Müasir Tətbiqlər"
4. *Nivaldo J. Tro tərəfindən* "Kimya: Molekulyar yanaşma"
5. *Paula Yurkanis* -"Üzvi Kimya".

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	

Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	Cytology and histology
Course Unit Code	**İF-BO4**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2

Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Narmin Mirzamammadli
Name of Lecturer (s)	Narmin Mirzamammadli
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description: Cytology is the study of the cell, and it is, therefore, of all fields the one which comes closest to the heart of the major quest of biology-the understanding of life in its essence. Histology is the microscopic study of tissues and cells used in understanding the pathogenesis and diagnosis of various diseases. Cells are the tiny living units that form the tissues, organs and structures within the body.

Objectives of the Course: The subject ``Histology and cytology`` is a vital component of medical research and advancement. Through a microscopic examination of tissues, researchers can identify significant changes in a tissue's appearance and internal structure associated with diseases. These findings have been instrumental in developing new treatments and diagnostic techniques that have significantly improved patient outcomes. This study has led to advances in procedures such as kidney transplantation, treatment for liver cirrhosis, and cataract surgery.

13. Operations of the oil and gas industry across the value chain
14. Relationships and interactions between industry players
15. Importance of oil and gas in the economy
16. Likely future scenarios for the industry

Learning Outcomes: to analyze and describe the short development history of plant cytology and histology, the main problems and development prospects of molecular anatomy;

At the end of the course the student will be able to		Assessment
1	- to interpret the mechanism and characteristics of the physiological processes occurring in the human cell;	
2	- to explain the interrelationships between the functions of human organs;	
3	- to use a microscope, to work independently in laboratory experiments on plant samples, to prepare various temporary and permanent preparations;	
4	- to prepare the necessary electronic teaching materials, presentations and presentations according to the relevant lesson topics using various computer programs.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		General information about cystology	
2		Chemical composition of cells	
3		General information about plant case, intercellular relationship	
4		Organelles. sER and ER	
5		Golgi apparatus. Lysosomes	
6		Mytochondri and plastids	
7		The structure of the nucleus and chromosomes	
8		Mitosis, Meiosis, Amitosis	
9		General İnformation about Histology	
10		Histological research methods	
11		General characteristics of tissues. Epithelial tissue (Textus conjunctivus)	
12		Connective tissue. General characteristics.	
13		Muscle tissue. of muscle tissue morphofunctional characteristics and classification.	
14		Nervous tissue. General of nervous tissue characteristics and	

		functional properties	
15		Plant Tissues. Plant tissues general characteristics	
16		Lab 1: Microscopic Examination of the Structure of a Typical Plant and Animal Cell	
17		Lab 2: Preparation and Observation of Stained Onion Epidermis Cells	
18		Lab 3: Observation of Mitochondria in Stained Muscle or Plant Cells	
19		Lab 4: Isolation and Microscopical Study of Plastids from Plant Cells (Chloroplasts, Chromoplasts, Leucoplasts)	
20		Lab 5: Observation of the Nucleus and Nucleolus in Stained Cells	
21		Lab 6: Mitosis in Onion Root Tip Cells – Microscopic Analysis of Phases	
22		Lab 7: Meiosis Observation in Pollen Mother Cells of Plants	
23		Lab 8: Demonstration of Endoplasmic Reticulum Using Electron Micrographs	
24		Lab 9: Golgi Apparatus and Lysosomes: Histochemical Detection Methods	
25		Lab 10: Preparation and Microscopic Study of Epithelial Tissue from Animal Specimens	
26		Lab 11: Observation and Classification of Connective Tissue (Loose, Dense, Cartilage, Bone)	
27		Lab 12: Examination of Blood Smear and Identification of Blood Cells (Specialized Connective Tissue)	
28		Lab 13: Histological Study of Muscle Tissue Types (Skeletal, Cardiac, Smooth)	
29		Lab 14: Microscopic Examination of Nervous Tissue – Neurons and Glial Cells	
30		Lab 15: Study of Plant Tissues: Differentiation Between Meristematic and Permanent Tissues	

Recommended Sources

TEXTBOOK(S)

1. **Junqueira's Basic Histology: Text and Atlas"**-*Anthony L. Mescher*
2. **"Color Atlas of Cytology, Histology, and Microscopic Anatomy"**-*Wolfgang Kühnel*
3. **"Histology: A Text and Atlas"**-*Michael H. Ross and Wojciech Pawlina*
4. **"Cytology and Histology"**-*Abraham L. Kierszenbaum*
5. **"Functional Histology: Text and Colour Atlas"**-*Jeffrey B. Kerr, Alan Peters*.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	

Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Individual development and evolution**
Course Unit Code	**İF-BO5**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	1
Year of Study	1
Semester when the course unit is delivered	2

Course Coordinator	PhD.Lala Gurbanova
Name of Lecturer (s)	PhD.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description: Individual development and evolution are general biological sciences that study the processes occurring in sex cells, the morphofunctional characteristics of reproductive tissues, the development of the individual, fertilization, division, ontogenesis. Evolution and evolutionary theory - in biology, studies the ideas and concepts that analyze the historical development of the Earth's biosphere and its individual species.

Objectives of the Course: The main objective of the subject is to teach students about the tissues that form individual organs, their morphological and functional characteristics, and the embryonic and postembryonic development and regularities of an individual starting from fertilization in sexually reproducing organisms. The main objective of the course is to familiarize students with the processes of evolution, to explain the regularities and driving forces of evolution. Students will also acquire practical skills.

17. Operations of the oil and gas industry across the value chain
18. Relationships and interactions between industry players
19. Importance of oil and gas in the economy
20. Likely future scenarios for the industry

Learning Outcomes Further increase knowledge about the history of the development of the science of individual development and evolution, their subject and tasks;;

At the end of the course the student will be able to		Assessment
1	Acquire knowledge about tissues, their structure, types and functions.	
2	Study the developmental processes of individual organs in the embryonic and postembryonic periods in ontogenesis.	
3	Study different tissues using a microscope in laboratory conditions.	
4	To explain the causes and laws of evolution.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani within the field of specialization;	
2	Communication skills in at least one foreign language within the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the prospective development of our national state;	
4	Ability to identify the threats and challenges facing the national state	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to	

	create databases	
7	Ability to work in a team and to achieve collaborative solutions to problems	
8	Ability to adapt to new conditions, take initiative, and maintain the determination to succeed	
9	Ability to identify and select additional information resources for problem-solving	
10	Skills to analyze, summarize, and apply relevant information for professional purposes	

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

Course Contents

Week	Chapter	Topics	Exam
1		Individual development and evolution: subject, methods, history of development	
2		On the general characteristics of tissues	
3		Sexual organs. Gametogenesis, oogenesis and spermatogenesis	
4		General characteristics of division, morula, blastula, gastrulation. Development of organs of mesoderm origin.	
5		Organogenesis. Development of organs of ectoderm and endoderm origin.	
6		Extraembryonic organs. Differentiation, determination, integration and introduction.	
7		Postembryonic development, metamorphosis.	
8		Growth, reproduction, regeneration, embryogenesis.	
9		The subject of the science of evolutionary theory, history of development.	
10		Darwin's evolutionary theory and the development of evolutionary theory in the post-Darwinian period.	
11		The formation of life and its main characteristics.	
12		Evidence of evolution and methods of studying it.	
13		The elementary structural unit of evolution and the elementary evolutionary event.	
14		Hereditary variations - as the elementary material of evolution.	
15		Natural selection as the driving force of evolution.	
16		Laboratory work: 1. Swelling of colloidal bodies in water	
17		Laboratory work No. 2. The difference in the permeability of living and non-living protoplasm	
18		Laboratory work: 3. Determination of the absorption force of a cell	
19		Laboratory work: No. 4. Absorption phenomenon	
20		Laboratory work: No. 5. The effect of light on the formation of chlorophyll.	
21		Laboratory work No. 6. Formation of starch in light	
22		Laboratory work: No. 7. Determination of respiration coefficient in oilseeds	
23		Laboratory work: No. 8. Microchemical analysis of ash	

Recommended

Sources
TEXTBOOK(S)

1. **"Developmental Biology"**-*Scott F. Gilbert*
2. **"Evolutionary Developmental Biology"**-*Brian K. Hall*
3. **"Principles of Development"**- *Lewis Wolpert et al.*
4. **"Evo-Devo: Evolutionary Developmental Biology of Animals"**-*Wallace Arthur*

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Plant morphology and anatomy**
Course Unit Code	**İF-BO6**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	PhD.Lala Gurbanova
Name of Lecturer (s)	PhD.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description: During the teaching of the subject of plant morphology and anatomy, we will study the morphological structure of the plant organism, its adaptation to the external environment, the organization of the plant cell, the features of the anatomy of plant organs, and the relationship between organs. Currently, plant morphology and anatomy is a developing science. Modern botany is increasingly deepening its understanding of the most subtle mechanisms of the processes occurring in the plant organism by studying them at the molecular and genetic levels. Therefore, throughout the course, we will try to study issues that meet the requirements of the modern era. Plant morphology and anatomy are one of the main sections of botany. Plant morphology and anatomy occupy an important place in biological sciences. Without knowing the external and internal structure of plants and without a deep understanding of the processes occurring in them, it is impossible to control the development and flowering of plants and give them any direction to obtain high yields. Plant morphology and anatomy teaches the formation of higher plants on earth, their evolution, the study of thallus plants, the internal and external structures of plant organisms and their complexity, individual development, the formation of vegetative and generative organs, and morphological concepts and patterns.

Objectives of the Course: - providing information about the internal and external structures of plant organisms, their individual development, and the microscopic structures of historical plants;
- in the study of metamorphosis of plant morphology, the regularities of the arrangement of any plant organ - leaves, branches, and flower parts, the transformation of plant organs into another organ as a result of the influence of external conditions, and the possibility of one plant group in the development of plants to switch to another group;
- educating students about the main problems and development prospects of modern botany, instilling the importance of the efficient use and protection of vegetation;

- forming a worldview that approaches these areas scientifically and methodologically correctly and increasing interest in biological science.

21. Operations of the oil and gas industry across the value chain
22. Relationships and interactions between industry players
23. Importance of oil and gas in the economy
24. Likely future scenarios for the industry

Learning Outcomes: To know the subject of plant morphology and anatomy, its historical development, the main problems of modern botany, and perspectives for its advancement;

At the end of the course the student will be able to		Assessment
1	-To learn the main methods of plant morphology and anatomy, to study the individual development of plants and their microscopic and macroscopic structures, to observe and compare normally developed plants;	
2	-To form an understanding of the forms of organizing instruction, its goals and objectives;	
3	- The structural features of a typical plant cell;	
4	- The general characteristics of plant tissues and the interrelationships between the structures of organs formed by them.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani within the field of specialization;	
2	Communication skills in at least one foreign language within the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the prospective development of our national state;	
4	Ability to identify the threats and challenges facing the national state	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to create databases	
7	Ability to work in a team and to achieve collaborative solutions to problems	
8	Ability to adapt to new conditions, take initiative, and maintain the determination to succeed	
9	Ability to identify and select additional information resources for problem-solving	
10	Skills to analyze, summarize, and apply relevant information for professional purposes	

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

Course Contents

Week	Chapter	Topics	Exam
1		Plant anatomy, its subject and history of development. Structure of the plant cell	

2		Plant tissues: Meristem tissue. Covering tissue. Parenchyma tissue. Reserve nutrients	
3		Plant tissues: Absorbent tissue. Mechanical tissue. Conductive tissue. Secretory tissue	
4		Anatomy of vegetative organs of plants: anatomical structure of the root. Anatomical structure of the stem. Anatomical structure of the leaf	
5		Anatomy of vegetative organs of plants: anatomical structure of the root. Anatomical structure of the stem. Anatomical structure of the leaf	
6		Anatomy of reproductive organs of plants: Anatomical structure of the flower	
7		Anatomy of reproductive organs of plants: Anatomical structure of the seed. Anatomical structure of the fruit	
8		Plant morphology, its subject and history of development. Organography and general regularities of plant structure (basic morphological concepts)	
9		Morphology of vegetative organs: root	
10		Morphology of vegetative organs: stem	
11		Morphology of vegetative organs: leaf	
12		Reproduction in plants and its types	
13		Morphology of generative organs: Flower. Structure and parts of the flower. Androecium. Microsporogenesis and microgametophyte Gynoecium. Megasporogenesis and megagametophyte. Flower groups. Pollination. Fertilization	
14		Gynoecium. Megasporogenesis and megagametophyte. Inflorescence types. Pollination. Fertilization	
15		Seed, embryo, sprout. Fruit. Adaptation of seed and fruit to dispersal	
16		Laboratory work No. 1. General rules of work in the study of plant anatomy. The structure of a plant cell: epidermis, plastids, sheath	
17		Laboratory work No. 2. The structure of plant tissues: meristem, epidermis	
18		Laboratory work: 3. Structure of plant tissues: mechanical fibers, collenchyma, tissue. Conductive, fibrous-tubular bundles. Resinous paths and milk ducts	
19		Laboratory work: No. 4. Anatomy of vegetative organs of plants: anatomical structure of the root and stem.	
20		Laboratory work: No. 5. Anatomy of vegetative organs of plants: anatomical structure of the leaf. Anatomical structure of pine conifer	
21		Laboratory work No. 6. Anatomy of the reproductive organs of plants: anatomical structure of flower parts	
22		Laboratory work: No. 7. Anatomy of the reproductive organs of plants: anatomical structure of the seed and fruit	
23		Laboratory work: No. 8. Acquaintance with the general regularities of the structure of plant organs	

24		Laboratory work: No. 9. Morphological structure of the root. Longitudinal and transverse sections of the root tip.	
25		Laboratory work No. 10. Morphological structure of the stem. Types of shoots. Structure of the stem of monocots and dicots	
26		Laboratory work No. 11. Morphological structure of leaves. Anatomical structure of the dorsoventral leaf	
27		Laboratory work No. 12. Cell reproduction: mitosis or karyokinesis division	
28		Laboratory work: No. 13. Morphology of generative organs: structure and parts of the flower.	
29		Laboratory work: No. 14. Morphology of generative organs: flower clusters, fruit	
30		Laboratory work: 15. Morphology of generative organs: seed, embryo, sprout	

Recommended
Sources
TEXTBOOK(S)

1. **Esau's Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body – Their Structure, Function, and Development"**- *Ray F. Evert*.
2. **"Plant Systematics: A Phylogenetic Approach"-***Walter S. Judd, Christopher S. Campbell, Elizabeth A. Kellogg, Peter F. Stevens*
3. **"Plant Anatomy***"*- *A.F. K. Esau*
4. ***"Plant Morphology"****- Arthur J. Eames*
5. **"An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century** -*Charles B. Beck*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration	Total

		(hour)	Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**The primitive plants and fungi**
Course Unit Code	**İF-BO7**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	PhD.Lala Gurbanova
Name of Lecturer (s)	Phd.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: Primitive plants and fungi occupy a special place among the subjects that	

determine the level of theoretical professional training of biologists. The systematics of primitive plants and fungi, the principles of classification of living organisms, artificial, natural and phylogenetic systems, as an elementary unit of species classification are studied. Throughout the course, knowledge about other taxonomic units: genus, family, order, superorder, class, divisions, binary nomenclature is taught. The main systematic categories, phylogenetic systems, concepts about primitive plants and a summary of their divisions are given. The main divisions of algae, fungi and mosses are taught. The importance of algae in nature and in human life is studied, the general characteristics of the world of fungi, morphological types of mosses, their role in nature and their practical significance are studied.		
Objectives of the Course: The purpose of the course on elementary plants and fungi is to familiarize students with the characteristic features of plant structure and life, their biological diversity, as well as the principles of classification of the most important elementary plant groups. - to educate students about the main problems and development prospects of modern systematics, to instill in them the importance of the efficient use and protection of vegetation; - to form a worldview that approaches these areas scientifically and methodologically correctly and to increase interest in biological science		
25. Operations of the oil and gas industry across the value chain 26. Relationships and interactions between industry players 27.Importance of oil and gas in the economy 28. Likely future scenarios for the industry		
Learning Outcomes: To learn the basics of the comparative morphological method, to get acquainted with the basics of the classification of the plant kingdom;		
At the end of the course the student will be able to		Assessment
1	-The main characteristics of plants belonging to various systematic groups, the diversity of the plant kingdom, its evolution, the role of plants in nature and human activity;	
2	-Methods for describing primitive plant groups and individual members;	
3	- Collect primitive plants and fungi, dry them, label them, independently determine the systematic affiliation of the object;	
4	-Methods for describing fungal groups and individual members;	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	

5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Primary plants and the subject of the subject of fungi, goals and objectives. Taksonomical categories. The role of algae in nature and human life.	
2		Branch of the Blue-Green algae, systematics and characteristics.	
3		Red Algae. The systematics, characteristics and significance of the department.	
4		Green algae. Systematics, characteristics, characteristics and significance of the structure.	
5		Green algae. Systematics, characteristics, characteristics and significance of the structure.	
6		Oxrophyte Algae. Systematics, characteristics and significance of diatom algae.	
7		Oxrophyte Algae. Systematics, characteristics and significance of diatom algae.	
8		Oxrophyte Algae. Systematics, characteristics and importance of brown algae.	
9		The kingdom of fungi. General features, systematics. Myxomycota.	
10		Chytridiomycota class. Systematics, characteristics, number of classes.	
11		The class of zigomycetes. The role in nature and in human life. Systematicization, characteristics of class, number of specieses	
12		The class of bazidiomisets. The role in nature and in human life. Systematicization, characteristics, number of specieses.	
13		Askomisets, class systematics, characteristics, number of types.	
14		History of development of Lichenology. Morpho-physiology of Lichen	
15		Systematic system of Lichen	
16		Laboratory work: 1. The role of algae in nature and human life	
17		Laboratory work No. 2. Department of blue-green algae	
18		Laboratory work: 3. Department of red algae	
19		Laboratory work: No. 4. Department of green algae	
20		Laboratory work: No. 5. Department of green algae.	

21		Laboratory work No. 6. Department of ochrophyte algae. Diatom algae	
22		Laboratory work: No. 7. Department of ochrophyte algae. Brown algae	
23		Laboratory work: No. 8. Department of Dinophytes, Cryoptophytes and Euglena algae	
24		Laboratory work: No. 9. Slime molds	
25		Laboratory work No. 10. Class Chytridiomycetes	
26		Laboratory work No. 11. Class Zygomycetes	
27		Laboratory work No. 12. Basidiomycetes class	
28		Laboratory work: No. 13. Class Ascomycetes	
29		Laboratory work: No. 14. Morpho-physiology of shibae.	
30		Laboratory work: 15. Systematics of ants	

Recommended
Sources
TEXTBOOK(S)

1. **"Introductory Phycology"**-*H.D. Kumar*
2. **"Bryophyte Biology"**-*B.G. Goffinet and A.J. Shaw*
3. **"Fungi: Biology and Applications"**-*Kevin Kavanagh*
4. **"The Biology of Fungi, Bacteria, and Viruses"**-*P.D. Sharma*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			

Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Higher plants**
Course Unit Code	**İF-BO8**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	2
Semester when the course unit is delivered	2
Course Coordinator	PhD.Lala Gurbanova
Name of Lecturer (s)	PhD.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: Higher plants occupy a special place among the subjects that determine the level of theoretical professional preparation of students studying biology. Higher plants study the principles of classification of living organisms, artificial, natural and phylogenetic systems, species as an elementary unit of classification. Throughout the course, knowledge about other taxonomic units: genus, family, order, superorder, class, division, binary nomenclature is taught. The main systematic categories, phylogenetic systems, concepts about higher plants and a summary of their divisions are given. Classification and characteristic features of angiosperm plants, bryophytes, planiformes or arthropods, gymnosperms, conifers or cone-bearing, angiosperm or flowering plant divisions are studied. The importance of higher plants in nature and human life, their role in nature and their practical significance are studied.	
Objectives of the Course: The purpose of the higher plant course is to familiarize students with the	

characteristic features of plant structure and life, as well as the principles of classification of the most important plant groups.
- to identify plants to the family, genus and species using special identification books as a result of the knowledge gained in the laboratory exercises taught;
- to obtain detailed information about the distribution areas of plants found in the territory of the Republic of Azerbaijan, the plant groups they form;
- to educate students about the main problems and development prospects of modern systematics, to instill in them the importance of the efficient use of vegetation and its protection;
- to form a scientifically and methodologically correct worldview in these areas and to increase interest in biological science.

29. Operations of the oil and gas industry across the value chain
30. Relationships and interactions between industry players
31. Importance of oil and gas in the economy
32. Likely future scenarios for the industry

Learning Outcomes: as a result of studying the subject, master the basics of the comparative morphological method, get acquainted with the basics of the classification of the plant world;

At the end of the course the student will be able to		Assessment
1	- the main characteristics of plants belonging to various systematic groups, the diversity of the plant world, its evolution, the role of plants in nature and human activity;	
2	- methods for describing higher plant groups and individual members;	
3	- collect plants, dry them, label them, independently determine the systematic affiliation of the object;	
4	- use ICT and electronic resources on sections and topics, prepare various electronic teaching materials, presentations.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani within the field of specialization;	
2	Communication skills in at least one foreign language within the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the prospective development of our national state;	
4	Ability to identify the threats and challenges facing the national state	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to create databases	
7	Ability to work in a team and to achieve collaborative solutions to problems	
8	Ability to adapt to new conditions, take initiative, and maintain the determination to succeed	
9	Ability to identify and select additional information resources for problem-solving	
10	Skills to analyze, summarize, and apply relevant information for	

	professional purposes		
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
Course Contents			
Week	Chapter	Topics	Exam
1		Subject, goals and objectives of the subject of systematics of higher plants. Division Bryophyta: evolution, classification, characteristic features, important representatives.	
2		Division Lycopodiophyta: evolution, classification, characteristic features, important representatives.	
3		Division Sphenophyta: evolution, classification, characteristic features, important representatives.	
4		Division Pteridophyta: evolution, classification, characteristic features, important representatives.	
5		Division Gymnospermae: evolution, classification, characteristic features, important representatives. Classes Pteridospermopsida and Bennettitopsida.	
6		Classes Cycadopsida and Ginkgoopsida: evolution, classification, characteristic features, important representatives.	
7		Evolution, classification, characteristic features, important representatives.	
8		Division: Angiospermae. Class. Dicotyledoneae. Subclass Magnollidae: evolution, classification, characteristic features, important representatives.	
9		Subclass Ranunculidae: evolution, classification, characteristics, important representatives. Subclass Caryophyllidae: evolution, classification, characteristics, important representatives.	
10		Subclass Dillenidae: evolution, classification, characteristics, important representatives. Subclass Hamamelidae: evolution, classification, characteristics, important representatives.	
11		Subclass Rosidae: evolution, classification, characteristics, important representatives	
12		Subclass Lamiidae: evolution, classification, characteristics, important representatives	
13		Subclass Asteridae: evolution, classification, characteristics, important representatives	
14		Class: Monocotyledoneae. Subclass Liliidae: evolution, classification, characteristics, important representatives.	
15		Subclass Commelinidae: evolution, classification, characteristics, important representatives	
16		Laboratory work: 1. General characteristics of the bryophyte department on the example of polymorph marchansia and bird moss	
17		Laboratory work No. 2. General characteristics of the bryophyte	

		department on the example of pinnate sphagnum and Swiss selaginella	
18		Laboratory work: 3. General characteristics of the phylum Arthropoda or sphagnum on the example of the steppe horsetail	
19		Laboratory work: No. 4. Alternation of generations on the example of male fern, salvinia, marsilia.	
20		Laboratory work: No. 5. General characteristics of extinct and modern representatives of the gymnosperm department on the example of bennettite, cycad and kingo plants	
21		Laboratory work No. 6. General characteristics of the order of conifers belonging to the class of conifers using the example of the species of black pine and common pine	
22		Laboratory work: No. 7. General characteristics of the orders of Asteraceae, Knetum and Welwitschia of the class of Cotyledons Division: Angiospermae. Class. Dicotyledoneae. Subclass Magnollidae: evolution, classification, characteristic features, important representatives	
23		Laboratory work: No. 8. General characteristics of the subclass Magnoliidae using the example of large-flowered magnolia and white lily	
24		Laboratory work: No. 9. General characteristics of the subclasses ranunculids on the example of the buttercup and common poppy plants, and carophyllids on the example of the common beet.	
25		Laboratory work No. 10. General characteristics of the characteristic rows of the Hamamelid subclass on the example of common hazel. General characteristics of the characteristic rows of the Dillenid subclass on the example of white willow, common cotton plants	
26		Laboratory work No. 11. General characteristics of the Rosid subclass using the example of garden strawberries, common apples, and common cherries	
27		Laboratory work No. 12. General characteristics of the Rosid subclass on the example of silver acacia, common erkevan, meadow clover, field carrot	
28		Laboratory work: No. 13. General characteristics of the subclass Lamid on the example of desert ivy, common potato plants. General characteristics of the subclass Asterid on the example of common sunflower.	
29		Laboratory work: No. 14. Characteristic features of the Lillid subclass on the example of the common onion and saffron plant	
30		Laboratory work: 15. General characteristics of the subclass Commelinids, order Cereals	

Recommended
Sources
TEXTBOOK(S)

1. **"Botany for Degree Students – Volume I: Algae, Fungi, Bryophyta, Pteridophyta, Gymnosperms"-*B.P. Pandey***
2. **"The Biology of Plants"- *Peter H. Raven, Ray F. Evert, Susan E. Eichhorn***

3. **"Plant Physiology and Development"-*Lincoln Taiz, Eduardo Zeiger, Ian Max Moller, Angus Murphy***
4. **"Introduction to Plant Biology"- *Kingsley R. Stern (now by James Bidlack)***
5. **"Plant Systematics: A Phylogenetic Approach"-*Walter S. Judd et al.***

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Invertebrates**
Course Unit Code	**İF-BO9**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Konul Ahmadova
Name of Lecturer (s)	Konul Ahmadova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:
"Invertebrates" is one of the main fundamental biological subjects, which is taken by students in the second year of study. The material of this course covers almost the entire animal kingdom (with the exception of a single Chordate type), and provides extensive information about the structure, classification, lifestyle, role in the biosphere and importance in human life, origin and evolution of various animals at different stages of development. The main goal of the course is to help students understand this huge factual material.

Objectives of the Course: The main goal of the course is to help students understand this vast factual material with the help of various visual aids, and to acquire knowledge about the structure, lifestyle, classification, and distribution of representatives of the invertebrate animal kingdom.

33. Operations of the oil and gas industry across the value chain
34. Relationships and interactions between industry players
35. Importance of oil and gas in the economy
36. Likely future scenarios for the industry

Learning Outcomes: To become familiar with the subject, goals and objectives of the invertebrate science;

At the end of the course the student will be able to		Assessment
1	As a result of studying the subject, to acquire knowledge about the main characteristics of invertebrates belonging to various systematic groups;	
2	- To have the ability to describe primitive invertebrates;	

3	- To participate in field research, to acquire the knowledge of collecting samples;	
4	- To acquire the knowledge of fixing samples and classifying samples according to modern classification;	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani within the field of specialization;	
2	Communication skills in at least one foreign language within the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the prospective development of our national state;	
4	Ability to identify the threats and challenges facing the national state	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to create databases	
7	Ability to work in a team and to achieve collaborative solutions to problems	
8	Ability to adapt to new conditions, take initiative, and maintain the determination to succeed	
9	Ability to identify and select additional information resources for problem-solving	
10	Skills to analyze, summarize, and apply relevant information for professional purposes	

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

Course Contents

Week	Chapter	Topics	Exam
1		Subject, tasks, history of development of science and scientific directions of invertebrate zoology. Primitive or Unicellular (Protozoa) subkingdom.	
2		Origin of multicellular animals. Phagocytella subkingdom. Placozoa phylum. Parazoa phylum. Spongia phylum.	
3		Eumetazoa phylum. Radiata phylum. Coelenterata phylum. Ctenophora phylum.	
4		Bilateria phylum. Acoelomata or Primitive worms (Scolecida) phylum. Plathelminthes phylum	
5		Nemertini phylum. Phylum Nemathelminthes. Phylum Acanthocephalus.	
6		Subphylum Coelomata. Phylum Annelida.	
7		Phylum Arthropoda.	
8		Subphylum Chelicerata.	
9		Subphylum Tracheata. Class Myriapoda. Class Insecta.	

10		Subphylum Tracheata. Seasonal development cycles of insects.	
11		Phylum Onychophora. Phylum Mollusca.	
12		Phylum Tenticulata.	
13		Phylum Echinodermata.	
14		Phylum Hemichordata. Phylum Pogonophora.	
15		Phylum Chaetognatha. The main stages of the phylogenetic development of the animal kingdom.	
16		Laboratory topic: Microscopy of zoological objects. The structure of amoeba, flagellates and infusoria	
17		Lab Topic: The Internal and External Appearance of Sponges	
18		Laboratory topic: Internal and external structure of rodents	
19		Laboratory topic: Internal and external structure and life cycle of flatworms on the example of trematodes	
20		Laboratory topic: Internal and external structure and life cycle of flatworms on the example of cestodes	
21		Laboratory topic: Internal and external structure of roundworms in the example of Askari-din	
22		Laboratory topic: Internal and external structure of annelids on the example of oligochaetes	
23		Laboratory topic: Internal and external structure of crustaceans, using the example of crayfish	
24		Laboratory topic: External structure of polychaetes	
25		Laboratory topic: External and internal structure of insects	
26		Laboratory topic: External structure of arachnids on the example of scorpions, spiders and Ixodes ticks	
27		Laboratory topic: Internal and external structure of gastropod mollusks, using the example of the grape snail.	
28		Laboratory topic: Internal and external structure of bivalve mollusks, in the case of Anodonta.	
29		Laboratory topic: Internal and external structure of cephalopods using the example of squid.	
30		Laboratory topic: External structure of echinoderms, such as starfish, sea urchins, and ophiura	

Recommended
Sources
TEXTBOOK(S)

1. **"Invertebrate Zoology"**-*Ruppert, Fox, and Barnes*
2. **"Invertebrates"**-*Richard C. Brusca, Wendy Moore, Stephen M. Shuster*
3. **"A Textbook of Invertebrate Zoology"**-*E.L. Jordan and P.S. Verma*
4. **"Invertebrate Zoology"**-*R.L. Kotpal*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	

Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Vertebrates**
Course Unit Code	**İF-B10**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Konul Ahmadova
Name of Lecturer (s)	Konul Ahmadova

Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description: This course provides a comprehensive overview of the biology, diversity, and evolution of vertebrate animals. Emphasis is placed on comparative anatomy, physiology, behavior, and ecology of the major vertebrate groups, including fishes, amphibians, reptiles, birds, and mammals. The course explores key adaptations such as locomotion, respiration, circulation, reproduction, and sensory systems that have enabled vertebrates to occupy a wide range of habitats. Phylogenetic relationships and evolutionary trends are examined to understand the origin and diversification of vertebrates. Laboratory sessions include dissection and analysis of representative species to reinforce lecture content and develop practical skills in anatomical and taxonomic studies.

Objectives of the Course: The objectives of the Vertebrates course are to provide students with a comprehensive understanding of the major characteristics and evolutionary trends of vertebrate animals, from jawless fishes to mammals. Students will compare and contrast the anatomy and physiology of various vertebrate classes, emphasizing structural and functional adaptations, and will explore phylogenetic relationships using both morphological and molecular evidence. They will identify and classify major vertebrate taxa based on diagnostic traits, analyze the ecological roles and behavioral strategies of vertebrates, and interpret fossil evidence to trace vertebrate origins and diversification. Through laboratory work, students will develop practical skills in dissection, specimen handling, and anatomical observation. Additionally, they will evaluate current conservation issues affecting vertebrate biodiversity, apply comparative methods to assess evolutionary adaptations, and effectively communicate scientific concepts related to vertebrate biology both orally and in writing.

37. Operations of the oil and gas industry across the value chain
38. Relationships and interactions between industry players
39. Importance of oil and gas in the economy
40. Likely future scenarios for the industry

Learning Outcomes: Understand vertebrate diversity and evolution: Describe the major characteristics, evolutionary trends, and phylogenetic relationships among vertebrate groups using both morphological and molecular evidence.

At the end of the course the student will be able to		Assessment
1	Compare anatomical and physiological adaptations: Analyze and contrast the structure and function of key systems (e.g., skeletal, muscular, respiratory, circulatory, reproductive) across fish, amphibians, reptiles, birds, and mammals.	
2	Demonstrate practical skills: Perform dissections, handle specimens appropriately, and observe/analyze anatomical structures in laboratory settings.	
3	Interpret ecological roles and behavior: Explain the ecological significance and behavioral adaptations of vertebrates in diverse environments, including current conservation challenges.	

4	Communicate scientific knowledge: Effectively present and explain concepts in vertebrate biology through oral presentations, written reports, and scientific discussions.	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani within the field of specialization;	
2	Communication skills in at least one foreign language within the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the prospective development of our national state;	
4	Ability to identify the threats and challenges facing the national state	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to create databases	
7	Ability to work in a team and to achieve collaborative solutions to problems	
8	Ability to adapt to new conditions, take initiative, and maintain the determination to succeed	
9	Ability to identify and select additional information resources for problem-solving	
10	Skills to analyze, summarize, and apply relevant information for professional purposes	
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1		Introduction. Characteristics, classification of the phylum Chordates. Origin and evolution of Chordates.	
2		Primitive Chordates. Structural features, classification, importance in biocenosis of the subphylum Cephalopoda and Tunicates.	
3		Overview of the structure of vertebrates, skin, axial skeleton, skull and periosteum, internal organs and nervous system.	
4		Characteristics, classification, structural features, ecology and importance in biocenosis of the class Roundmouths. Biology of the Caspian lamprey.	
5		Characteristics, classification, skeleton and internal organs structure of cartilaginous fish, nervous system, ecology, importance in biocenosis	
6		Characteristics, classification, skin and skeletal structure of bony fish.	
7		Internal organs and nervous system structure of bony fish, ecology and importance in biocenosis.	

8		Characteristics, classification, skin and skeleton structure of amphibians	
9		Internal organs and nervous system of amphibians, ecology and importance in biocenosis.	
10		Anamnios and amniotes. Characteristics, classification, skin and skeleton structure of reptiles.	
11		Internal organs and nervous system of reptiles, ecology and importance in biocenosis.	
12		Characteristics, classification, skin and skeleton structure of birds	
13		Internal organs and nervous system of birds, ecology and importance in biocenosis.	
14		Characteristics, classification, skin and skeleton structure of mammals.	
15		Internal organs and nervous system of mammals, ecology and importance in biocenosis.	
16		Lab. No. 1. Characteristics, classification, general structure plan of the Chordate phylum	
17		Lab. No. 2. Acephalid subtype. Scalpel structure	
18		Lab. No. 3. Structural features of the subphylum Sarcochordates. Structure of Ascidians	
19		Lab. No. 4. Structural features of the class Roundworms. Biology of the Caspian lamprey.	
20		Lab. No. 5. The structure of the skin, skeleton and internal organs of cartilaginous fish. The structure of the shark	
21		Lab. No. 6. Skin and skeleton of bony fish. Structure of the fish scales	
22		Lab. No. 7. Internal organs and nervous system of bony fish	
23		Lab. No. 8 Skin and skeleton of amphibians. Structure of the pond frog	
24		Lab. No. 9. Internal organs and nervous system of amphibians	
25		Lab. No. 10. Skin and skeleton of reptiles. Structure of lizards	
26		Lab. No. 11. Internal organs and nervous system of reptiles	
27		Lab. No. 12. Skin and skeleton of birds. Structure of the steppe pigeon	
28		Lab. No. 13. Internal organs and nervous system of birds	
29		Lab. No. 14. The skin and skeleton of mammals. The structure of the common rabbit	
30		Lab. No. 15. Internal organs and nervous system of mammals	

Recommended
Sources
TEXTBOOK(S)

1. **"Vertebrate Life"**-*F. Harvey Pough, Christine M. Janis, John B. Heiser*
2. **"Vertebrates: Comparative Anatomy, Function, Evolution"**-*Kenneth Kardong*
3. **"Biology of Vertebrates"**-*P.S. Dhami and J.K. Dhami*
4. **"Chordate Zoology"**-*E.L. Jordan and P.S. Verma*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	

Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Human Anatomy and Physiology**
Course Unit Code	**İF-B11**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	7
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Phd.Nuriyeva Sevinc Asad

Name of Lecturer (s)	Phd.Nuriyeva Sevinc Asad
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:
"In the subject of "Human Anatomy and Physiology," students will be provided with information about the normal anatomical structure of the human body, physiological processes occurring in the organism, developmental characteristics, and the specific and general anatomical-physiological features unique to humans.

Objectives of the Course: The main goal of the subject is to teach students all the essential features of anatomy and physiology, which are among the fundamental biological sciences, and to ensure their proper understanding. The human being is the most superior of all living creatures and is a social entity. The proper functioning of human life depends on the normal development of the body and the systematic interrelation of organs in accordance with existing norms. Therefore, studying the normal anatomical structure and physiological processes of the human body is of great importance. A detailed study of the branches of anatomy and physiology, research methods, parts of the human skeleton, the structure and physiology of internal organs, and more is essential for training knowledgeable biologists in the future.

41. Operations of the oil and gas industry across the value chain
42. Relationships and interactions between industry players
43. Importance of oil and gas in the economy
44. Likely future scenarios for the industry

Learning Outcomes: Information about human anatomy and physiology, their development history, and subdivisions;

At the end of the course the student will be able to		Assessment
1	Detailed information about the human skeleton and bones, and mastering the material with the help of descriptive anatomy;	
2	General information about muscles, names and locations of individual muscles, teaching of tendons and the joint system, and the physiology of muscles	
3	Teaching about the autonomic nervous system, including the anatomical structure and physiology of its sympathetic and parasympathetic divisions;	
4	General and specific information about the brain and spinal cord, their anatomical characteristics, and physiological features ;	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	

2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		General information about anatomy and physiology. Divisions of anatomy. History of the development of anatomy and physiology. Physiological research methods.	
2		Basic characteristics of living organisms. Excitability. Excitation. Reflex and reflex arc. Characteristics of nerve centers.	
3		Parts of the human skeleton. Spine and vertebrae. Ribs. Sternum. Anatomical features of the bones of the upper and lower limbs. Anatomical structure of the skull bones.	
4		Anatomical structure of the muscular system and joints. General morphological and physiological features of muscles. Muscle fatigue. Physiological characteristics of smooth muscles.	
5		Spinal cord, its anatomical structure and features. Physiology of the spinal cord.	
6		Brain and its anatomical structure. Physiology of the central nervous system: features of brain physiology.	
7		Anatomy of the autonomic nervous system. Anatomical characteristics of the sympathetic and parasympathetic nervous systems. Physiological features of the autonomic nervous system.	
8		Physiology of higher nervous activity. Physiology of behavior.	

		Memory and its types. Sleep. Motivation. Emotion.	
9		General endocrinology and physiological regularities. Hormones of the endocrine glands and their functions.	
10		Anatomy and physiology of the digestive system.	
11		Respiratory system: anatomical characteristics of the larynx, trachea, bronchi, lungs, mediastinum, and pleura. Physiology of respiration. Types of respiration, pulmonary respiration.	
12		Urinary and reproductive system. Kidneys, ureters, urinary bladder, anatomical structure of male and female reproductive organs. Physiology of the excretory system. Formation and excretion of urine.	
13		General information about the circulatory system. Anatomical features of the heart. Cardiovascular system. Circulatory and lymphatic systems. Physiology of blood, blood plasma, and cellular elements.	
14		Sense organs. Anatomical characteristics of the skin, smell, taste, vision, balance, and hearing organs. Main physiological features of the analyzers.	
15		Metabolism and energy exchange.	

Recommended
Sources
TEXTBOOK(S)

1. Marieb, E.N. & Hoehn, K. (2018).
   Human Anatomy & Physiology (11th Edition)
2. Martini, F.H., Nath, J.L., & Bartholomew, E.F. (2017).
   Fundamentals of Anatomy & Physiology (11th Edition).
3. Saladin, K.S. (2020).
   Anatomy & Physiology: The Unity of Form and Function (9th Edition). McGraw-Hill Education.
4. Aliyev, M.Q., Huseynov, Ş.M., Mammadov, A.M. (2008).
   Human Anatomy – Baku: TQDK.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**210**
Total Workload/30(h)			**210\30**
ECTS Credit of the Course			**7**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Biochmeistry**
Course Unit Code	**İF-B12**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	1
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Phd.Lala Gurbanova
Name of Lecturer (s)	Phd.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program	-

Components	
Course description: "Biochemistry" is one of the main subjects for the specialties of Biology, Aquatic Plants and Aquaculture. Teaching this subject broadens students' worldview about the chemical foundations of living matter, allows them to understand the biochemical and molecular aspects of its existence and evolution. The exercises performed in the subject of biochemistry familiarize students with the methods of researching living things, are of great importance in their formation as scientific and research workers and in organizing their scientific and research work at a modern level. The subject of "Biochemistry" intended for biologists is organized into two parts: static and dynamic biochemistry sections. Static biochemistry considers the structure of natural compounds underlying the composition of living things, their physical and chemical properties, as well as the organization, diversity, mechanism of action and kinetics of enzymatic reactions of enzymes that perform the function of biological catalysts, while dynamic chemistry considers the biochemical foundations of substance and energy metabolism, the transfer and realization of genetic information..	
Objectives of the Course: Biochemistry, as a science emerging at the border of biology and chemistry, is closely related to physics and chemistry, as it is engaged in elucidating the molecular-biochemical foundations of the living world and uses physical-chemical methods to achieve its goal. In addition, modern biochemistry is closely related to physiology, genetics, molecular biology and a number of other biological disciplines and constitutes the methodological basis for their study at the modern biochemical-molecular level. The purpose of teaching biochemistry is to form in students complete and complete knowledge about the structure and properties of biopolymers (proteins, nucleic acids, carbohydrates, lipids), their monomers (amino acids, nucleotides, monosaccharides, fatty acids) and biologically active substances (vitamins, hormones), the metabolism of substances and energy, the interaction between biochemical processes and their regulation.	
45. Operations of the oil and gas industry across the value chain 46. Relationships and interactions between industry players 47.Importance of oil and gas in the economy 48. Likely future scenarios for the industry	
Learning Outcomes: The exchange of substances and energy and the ways of their regulation; - The biochemical basis of the realization and transmission of genetic information;	

At the end of the course the student will be able to		Assessment
1	- The chemical basis of the existence and vital activity of the living world;	
2	- The structure, properties of the substances that make up living things, the complexes they form and their functions;	
3	- The theoretical and practical significance of biochemistry and its relationship with other natural sciences;	
4	- Modern achievements of biochemistry and its possible areas of application.	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani within the field of specialization;	
2	Communication skills in at least one foreign language within the field of	

	specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the prospective development of our national state;	
4	Ability to identify the threats and challenges facing the national state	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data, and the ability to create databases	
7	Ability to work in a team and to achieve collaborative solutions to problems	
8	Ability to adapt to new conditions, take initiative, and maintain the determination to succeed	
9	Ability to identify and select additional information resources for problem-solving	
10	Skills to analyze, summarize, and apply relevant information for professional purposes	

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

Course Contents

Week	Chapter	Topics	Exam
1		Biochemistry, its goals and objectives, importance, relationship with other sciences.	
2		Carbohydrates, their classification, chemical composition, distribution in the body. Monosaccharides, oligosaccharides, structure and biological role.	
3		Lipids, classification, biochemical properties, composition, distribution, biological role.	
4		Information about nucleic acids. Chemical composition and types of nucleic acids. Structure I, II, III of DNA and RNA.	
5		Classification of proteins. Simple and complex proteins.	
6		Peptides, composition, biological role. Structures of proteins.	
7		Information about enzymes. Methods of separation and purification of enzymes. Structure and chemical composition of enzymes.	
8		General information about vitamins and coenzymes. Fat-soluble (A, D, E, K, F, Q) and water-soluble (group B, C) vitamins. Composition, biological role.	
9		General information about hormones. Mechanism of action and classification of hormones. Hormones of the secretory glands, chemical nature, functions.	
10		Metabolism and energy. Respiratory rate. Methods of studying metabolism	
11		Biochemistry of digestion. Absorption of substances in the digestive tract. Biological oxidation, mechanism.	
12		Nucleic acid metabolism. Degradation and synthesis of nucleic acids in the digestive tract.	

13		DNA biosynthesis (replication). Initiation stage of DNA biosynthesis. Elongation stage of DNA synthesis.	
14		General information about carbohydrate metabolism. Carbohydrate conversion in the digestive tract.	
15		Mineral metabolism.	

Recommended
Sources
TEXTBOOK(S)

1. **"Lehninger Principles of Biochemistry"-*David L. Nelson & Michael M. Cox***
2. **"Biochemistry"-*Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer*.**
3. **"Biochemistry"-*Donald Voet & Judith G. Voet***
4. **"Biochemistry"-*Pamela C. Champe, Richard A. Harvey & Denise R. Ferrier (Lippincott's Illustrated Reviews)***
5. **"Harper's Illustrated Biochemistry"-*Victor W. Rodwell et al.***

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Biodiversity**
Course Unit Code	**İF –B13**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
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	Sevinj Rajabova
Name of Lecturer (s)	Sevinj Rajabova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
This course provides a comprehensive introduction to the diversity of life on Earth, exploring the variety of organisms across all domains and kingdoms. Students will examine the origin, classification, and evolutionary relationships of major taxa, as well as the ecological roles they play in ecosystems. Emphasis is placed on understanding patterns and processes that generate and maintain biodiversity, including speciation, extinction, and adaptation. The course also covers the importance of biodiversity to ecosystem health, human well-being, and global sustainability. Students will analyze current threats to biodiversity—such as habitat loss, climate change, invasive species, and overexploitation—and evaluate conservation strategies at local and global levels.

Objectives of the Course: During the course, students will learn in detail about the rapid consumption of natural resources, the increase in the number of factors threatening biodiversity and ecosystems, the degradation of ecosystems as a result of human activity, the extinction and sharp decline in the numbers of many fauna and flora species and genera, and other information.

49. Operations of the oil and gas industry across the value chain
50. Relationships and interactions between industry players
51. Importance of oil and gas in the economy
52. Likely future scenarios for the industry

Learning Outcomes: Explain the concept and levels of biodiversity, and describe the evolutionary and ecological processes that generate and sustain it.

At the end of the course the student will be able to		Assessment
1	Classify major groups of organisms and analyze their evolutionary relationships using taxonomic and phylogenetic frameworks.	

2	Identify global biodiversity patterns and assess the natural and human factors influencing species distribution and ecosystem diversity.	
3	Evaluate threats to biodiversity and examine conservation strategies and policies aimed at protecting and restoring ecosystems and species.	
4	Communicate the importance of biodiversity and apply assessment tools to analyze conservation data in both scientific and practical contexts.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Biodiversity, the general concept of its protection. The biological diversity in Azerbaijan	
2		The National Programs and Conventions on the Biological Diversity	
3		The ecological factors affected to the biodiversity	
4		The conservation of the biodiversity at the population level	
5		The grouping of the species in the biocenosis, the life forms of the organisms	
6		The relationships of the organisms in the biocenosis	
7		The influence of the ecosystem on the biocenosis	
8		The ecological importance of the algae	
9		The role of the fungi in the formation of the biodiversity and the ecological groups of the fungus-like organisms	
10		The protection of the flora	
11		The anthropogenic influence on the flora	
12		The protection of the fauna	
13		The influence of the environmental degradation on the human	

		development	
14		The Law of the Republic of Azerbaijan on the specially protected nature areas and objects	
15		The essence and protection of the natural monuments	

Recommended
Sources
TEXTBOOK(S)

1. **"Biodiversity"**-*Edward O. Wilson*
2. **"The Diversity of Life"**-*Edward O. Wilson*
3. **"Essentials of Conservation Biology"**-*Richard B. Primack*
4. **"Biodiversity and Conservation"**-*Michael J. Jeffries*
5. **"Biological Diversity: Frontiers in Measurement and Assessment"**
   Edited by Anne E. Magurran & Brian J. McGill

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Microbiology**
Course Unit Code	**İF-B14**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Phd.Mahmud Humbatov
Name of Lecturer (s)	Phd.Mahmud Humbatov
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description: This course is dedicated to the study of microbiology, one of the main branches of biology. The general part of microbiology covers the morphology, classification, physiology, genetics, and ecology of microorganisms. During the course, the morphology and classification of microscopic protozoa, fungi, and viruses will be taught. Information will also be provided about antibiotics, infection, and immunity.

Objectives of the Course: One of the main objectives of the course is to teach the foundations of this science and to develop an understanding of its application in real life. By working with examples and case studies, the course aims to enhance students' biological knowledge and foster the development of critical thinking and problem-solving skills. Another goal of the course is to provide students with experience in scientific concepts such as observation, logic, analysis, objectivity, precision, and clear communication.

53. Operations of the oil and gas industry across the value chain
54. Relationships and interactions between industry players
55. Importance of oil and gas in the economy
56. Likely future scenarios for the industry

Learning Outcomes: To provide students with knowledge about the morphology, ultrastructure, environmental role, genetics, and physiology of microorganisms.

At the end of the course the student will be able to		Assessment
1	To support students academically and help them realize their full potential.	
2	To encourage student participation in the course and ensure an environment of mutual respect and understanding.	

3	To establish connections between microbiology and other biological disciplines.	
4	**To discuss the ecological and industrial importance of microorganisms,** such as their roles in biodegradation, fermentation, and biotechnology.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Subject, tasks and main directions of microbiology. History of emergence and development of microorganisms.	
2		Morphology and anatomy of microorganisms.	
3		Physiology of microorganisms.	
4		Genetics of microorganisms.	
5		Systematics of microorganisms: viruses, bacteriophages, bacteria, fungi, algae.	
6		Distribution of microorganisms in nature: microbiota of air, water, soil.	
7		Influence of environmental factors on microorganisms: biotic and abiotic factors.	
8		Mutual relationships between microorganisms.	
9		Important biochemical reactions caused by microorganisms.	
10		Participation of microorganisms in the cycle of substances.	
11		Pathogenic microorganisms and infections. Concept of immunity and immunology.	
12		Gram-positive, Gram-negative bacteria. Pathogenicity factors of microorganisms. Concept of virulence.	

13		Some viral diseases occurring in humans.	
14		Some viral diseases occurring in plants and animals.	
15		Fundamentals of sanitary microbiology.	
16		Lab 1: Microscopic Observation of Bacterial Cell Morphology	
17		Lab 2: Gram Staining Technique	
18		Lab 3: Observation of Fungal and Yeast Morphology	
19		Lab 4: Isolation and Cultivation of Microorganisms from Soil	
20		Lab 5: Water Microbiota Analysis	
21		Lab 6: Air Microbiota Detection by Sedimentation Method	
22		Lab 7: Study of the Effect of Temperature on Bacterial Growth	
23		Lab 8: Study of the Effect of pH on Microbial Growth	
24		Lab 9: Testing the Antibacterial Activity of Disinfectants and Antibiotics	
25		Lab 10: Observation of Bacteriophage Activity (Plaque Formation)	
26		Lab 11: Simple Biochemical Tests for Microbial Identification	
27		Lab 12: Fermentation Tests Using Carbohydrates	
28		Lab 13: Bacterial Conjugation Experiment (Genetic Transfer Study)	
29		Lab 14: Study of the Immune Response: Agglutination and Precipitation Reactions	
30		Lab 15: Identification of Pathogenic Bacteria and Their Virulence Factors	

Recommended
Sources
TEXTBOOK(S)

1. **"Microbiology: An Introduction"**-*Gerard J. Tortora, Berdell R. Funke, Christine L. Case*
2. **"Prescott's Microbiology"**-*Joanne M. Willey, Linda Sherwood, Christopher J. Woolverton*
3. **"Medical Microbiology"**-*Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller*
4. **"Brock Biology of Microorganisms"**-*Michael T. Madigan, Kelly S. Bender, Daniel H. Buckley*
5. **"Microbiology"**-*Lansing M. Prescott, John P. Harley, Donald A. Klein*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Plant Physiology**
Course Unit Code	**İF-B15**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Phd.Lala Gurbanova
Name of Lecturer (s)	Phd.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Welcome to the Plant Physiology course, one of the fundamental subjects in our education. During the study of plant physiology, we will explore the vital processes that occur in plants, such as growth, development, nutrition, respiration, reproduction, and their interactions with the external environment.

The foundation of physiology was laid in the 18th century through experiments conducted on plant

nutrition. Today, plant physiology is a rapidly developing science. Physiology is closely linked to anatomy; the relationship between the structure of plant organs and their physiological functions has led to the emergence of physiological anatomy.
Modern botany continues to deepen our understanding by studying the most intricate mechanisms of processes in plant organisms at the molecular and genetic levels. Therefore, throughout the course, we will focus on learning about issues that meet the demands of the modern era.

Objectives of the Course: Plant physiology is a science that studies the life processes occurring in plant organisms, explains them, reveals regularities, and on this basis shows the way to control the plant organism. Plant physiology is one of the main sections of botany. Plant physiology occupies an important place among biological sciences. In order to obtain high yields from various agricultural plants and to apply agrotechnical measures in this regard according to the needs of plants, it is necessary to know their life perfectly. Without knowing and deeply understanding the vital processes occurring inside plants, it is impossible to control the development and flowering of plants and give them any direction to obtain high yields.
- teaching the theoretical and practical importance of plant physiology, the mechanism of all the main physiological processes occurring in the plant organism;
- educating students about the main problems and development prospects of modern botany, instilling the importance of the efficient use of vegetation and its protection;
- forming a worldview that approaches these directions scientifically and methodologically correctly and increasing interest in biological science.

57. Operations of the oil and gas industry across the value chain
58. Relationships and interactions between industry players
59. Importance of oil and gas in the economy
60. Likely future scenarios for the industry

Learning Outcomes: The subject of plant physiology, its brief history of development, the main problems and development prospects of modern botany. Characteristics of the vital activity of a typical plant cell. General characteristics of plant tissues, the mutual relationships between the functions of the organs they form;

At the end of the course the student will be able to		Assessment
1	- the mechanism of all the main physiological processes occurring in the plant organism, the characteristics of growth and development;	
2	- the use of ICT and electronic resources on sections and topics, the preparation of various electronic teaching materials and presentations.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem	

	solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Subject, Purpose, and Tasks of the Plant Physiology Course	
2		Physiology of the Plant Cell	
3		Photosynthesis. Structure of the Photosynthetic Apparatus. Chemical Composition of Chloroplasts	
4		Pigment Systems of the Photosynthetic Apparatus	
5		Factors Affecting the Intensity of Photosynthesis	
6		Respiration in Plants. Modern Concepts of the Mechanism of Oxidation-Reduction Processes	
7		Enzyme Systems of Respiration. Glycolysis as the Central Part of Metabolism in the Plant Cell. Respiration and Photosynthesis	
8		Relationship Between Respiration and Other Functions of the Cell	
9		The Importance of Water in Plant Life Activities. Historical Development of the Study of Water Exchange	
10		Metabolism of Inorganic and Organic Substances in Plants	
11		Main Laws of Development and Growth of the Plant Organism	
12		Factors Affecting the Growth and Development of Plants	
13		Plant Movements	
14		Resistance of Plants to Extreme Conditions	
15		Phylogeny of Metabolism and Autoregulation of Metabolism in Plants	
16		Laboratory work: 1. Swelling of colloidal bodies in water	
17		Laboratory work No. 2. The difference in the permeability of living and non-living protoplasm	
18		Laboratory work: 3. Determination of the absorption force of a cell	
19		Laboratory work: No. 4. Absorption phenomenon	
20		Laboratory work: No. 5. The effect of light on the formation of chlorophyll.	
21		Laboratory work No. 6. Formation of starch in light	
22		Laboratory work: No. 7. Determination of respiration coefficient in oilseeds	
23		Laboratory work: No. 8. Microchemical analysis of ash	
24		Laboratory work: No. 9. Enzymes and secondary substances of woody plants.	
25		Laboratory work No. 10. Loss of dry mass during seed germination	
26		Laboratory work No. 11. Observation of pollen germination and pollen	

		tube growth	
27		Laboratory work No. 12. The effect of illumination duration on plant growth	
28		Laboratory work: No. 13. Effect of solution concentration on seed germination	
29		Laboratory work: No. 14. Protective effect of sugar on cytoplasm during freezing.	
30		Laboratory work: 15. Changes in reserve nutrients in the shoots of woody plants during winter dormancy	

Recommended Sources

TEXTBOOK(S)

1. **"Plant Physiology and Development"**-*Lincoln Taiz, Eduardo Zeiger, Ian M. Møller, and Angus Murphy*
2. **"Plant Physiology"**-*Frank B. Salisbury and Cleon W. Ross*
3. **"Introduction to Plant Physiology"** *By William G. Hopkins and Norman P. A. Hüner*
4. **"Plant Physiological Ecology"**- *Hans Lambers, F. Stuart Chapin III, and Thijs L. Pons*
5. **"Physiology of Plant Growth and Development"**-*M.B. Wilkinson and A. F. Davies*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			

Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Genetics**
Course Unit Code	**İF-B16**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	7
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Phd.Ayaz Mammadov
Name of Lecturer (s)	Phd.Ayaz Mammadov
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: This course provides a comprehensive introduction to the principles of genetics, exploring how genetic information is transmitted, expressed, and regulated in living organisms. The course covers classical Mendelian genetics, molecular genetics, gene expression and regulation, genetic mutations, population genetics, and the role of genetics in evolution and biotechnology. Laboratory sessions complement the theoretical content by offering hands-on experience in genetic analysis, including DNA extraction, PCR, gel electrophoresis, and bioinformatics tools for genome analysis. Modern genetics studies the phenomena of heredity and variation based on the achievements of biological sciences such as biochemistry, biophysics, cytology, embryology, microbiology, zoology, botany, breeding, plant breeding and animal husbandry. Genetic research has greatly enriched the theoretical field of biology, as well as zootechnics, veterinary medicine, agricultural animal breeding, plant breeding and seed production, and medicine.	
Objectives of the Course: This course aims to provide students with a solid foundation in the principles of genetics, including the mechanisms of heredity and the molecular basis of genetic information. Students will explore Mendelian and non-Mendelian inheritance, gene structure and function, and the processes of DNA replication, transcription, and translation. The course emphasizes the regulation of gene expression in both prokaryotes and eukaryotes, as well as the	

nature and impact of genetic mutations and chromosomal abnormalities. Learners will develop the ability to analyze inheritance patterns using pedigrees, Punnett squares, and genetic mapping techniques. The course also covers population genetics and evolutionary concepts to explain genetic diversity within and among populations. In addition, students will be introduced to modern genetic technologies such as PCR and CRISPR and their applications in medicine, agriculture, and biotechnology. Throughout the course, students will enhance their analytical and problem-solving skills while also considering the ethical, legal, and social implications of genetic research and technologies.

61. Operations of the oil and gas industry across the value chain
62. Relationships and interactions between industry players
63. Importance of oil and gas in the economy
64. Likely future scenarios for the industry

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	-Formation of an understanding of genetics;	
2	-Development of students' perception of the goals and objectives of the training;	
3	- Formation of knowledge about research conducted in the field of modern genetics;	
4	-Development of knowledge about the structure of DNA and RNA as the material basis of heredity, as well as genes and their mechanisms of action.	
5	-Critically assess the ethical, legal, and social issues surrounding genetic research and genetic engineering.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Wee	Chapter	Topics	Exam

k			
1		Methods, issues, stages of development of genetics.	
2		Material and molecular bases of heredity	
3		Methods of G. Mendel. Monohybrid and polyhybrid crossing. Interaction of non-allelic genes	
4		Methods of DNA and RNA decomposition	
5		Principle and types of electrophoresis	
6		Types and principle of PCR	
7		Mitosis division of a cell	
8		Meiosis division of a cell	
9		Chromosome structure	
10		Linked inheritance and crossover	
11		Genetic analysis in prokaryotes.	
12		Hereditary and non-hereditary variability	
13		Genetics of sex	
14		Gene theory. Gene structure	
15		Cytoplasmic inheritance	
16		Genetics of individual development.	
17		Fundamentals of genetic engineering	
18		Fundamentals of molecular genetics	
19		Fundamentals of biotechnology	
20		Population genetics	
21		Polyploidy	
22		Genetic bases of breeding	
23		Human genetics	
24		Lab. 1 Introduction to the structure and working principle of a genetics laboratory.	
25		Lab. 2. Safety rules in the laboratory.	
26		Lab. 3. Devices and equipment in the laboratory and their working principles.	
27		Lab. 4. Isolation of genomic DNA from samples using various protocols.	
28		Lab. 5. Preparation of agarose gel and working buffer.	
29		Lab. 6. Testing the quality of DNA in agarose gel	
30		Lab. 7. Preparation of PCR reaction and use of molecular markers and primers.	
31		Lab. 8. Analysis of the result after PCR using electrophoresis and Gel imaging device	
32		Lab. 9. Extraction of RNA from various tissues	
33		Lab. 10. Working principle of light microscope	
34		Lab. 11. Preparation of chromosome preparation at the metaphase stage	
35		Lab. 12. Karyotyping using a light microscope	
36		Lab. 13. Principles of breeding in animal husbandry	
37		Lab. 14. Hybridization of wheat varieties	
38		Lab. 15. Determination of GMO	

Recommended
Sources
TEXTBOOK(S)

1. **"Genetics: From Genes to Genomes"**-*Leland Hartwell, Michael Goldberg, Janice Fischer, and Lee Hood*
2. **"Genetics: A Conceptual Approach"**-*Benjamin A. Pierce*
3. **"Molecular Biology of the Gene"**-*James D. Watson et al.*
4. **"Principles of Genetics"**-*D. Peter Snustad and Michael J. Simmons*
5. **"Human Molecular Genetics"**-*Tom Strachan and Andrew Read*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**210**
Total Workload/30(h)			**210\30**
ECTS Credit of the Course			**7**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Enzymology**
Course Unit Code	**İF-B17**
Type of Course Unit	Campulsory
Level of Course Unit	
National Credits	-
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	Nigar Huseynova
Name of Lecturer (s)	Nigar Huseynova
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The main goal of teaching the subject "Enzymology" is to provide students with information about the characteristics, properties, classification, naming, mechanism of action, ways to regulate their activity, as well as areas of application of enzymes, and to familiarize students with the main problems of enzymology.

Objectives of the Course: Enzymology, a branch of biochemistry, has emerged as a separate science and is the science of the properties, structure, mechanism of action, and regulation of biocatalysts that facilitate biochemical reactions. This is closely related to the application of various enzymatic processes in numerous areas of industry, such as winemaking, brewing, baking, cheesemaking, and the production of organic acids, vitamins, and antibiotics. In general, the study of enzymes is of great importance for both fundamental and applied areas of biology, as well as for most practical areas of the chemical, food, and pharmaceutical industries involved in the production of various biologically active substances used in national economy and medicine.

65. Operations of the oil and gas industry across the value chain
66. Relationships and interactions between industry players
67. Importance of oil and gas in the economy
68. Likely future scenarios for the industry

Learning Outcomes: Justifies and applies methods for obtaining and partially purifying enzyme preparations from plant and animal tissues.

At the end of the course the student will be able to		Assessment
1	Determines the activity of enzymes and expresses it through activity units, knows the purity criteria of enzyme preparations, determines the degree of purity.	

2	Demonstrates modern knowledge of the chemical structure of enzymes, their properties as biocatalysts, classification and nomenclature, regulation of their activity, and intracellular localization.	
3	Based on knowledge of the kinetics of the enzymatic reaction, studies the effect of various factors on the rate of the enzymatic reaction, calculates the main catalytic indicators (Km, Ks, V0, Vmax), and presents the results obtained in graphical form.	
4	Explains the effect of inhibitors on the activity of enzymes, determines the type of inhibition.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction to enzymology. A Brief History of the Development of Enzymology	
2		Methods for isolation, obtaining and purifying enzymes. Units of enzyme activity.	
3		Chemical nature of enzymes. One- and two-component enzymes. Structure of the active site of enzymes.	
4		Cofactors of complex enzymes - coenzymes and prosthetic groups. The role of metals in the functioning of the enzyme molecule.	
5		Properties of enzymes. Activators and inhibitors of enzymatic reactions	
6		General ideas about catalysis. Mechanism of action of enzymes. The enzyme-substrate complex.	
7		Kinetics of enzymatic reactions. Initial speed. Factors influencing enzyme activity. Michaelis-Menten constant.	

8		Nomenclature and classification of enzymes. Enzyme code. Oxidoreductases, their classification, mechanism of action.	
9		Transferases, their classification, mechanism of action, main representatives.	
10		Hydrolases, their classification, mechanism of action, main representatives.	
11		Lyases, isomerases, lygases. The main representatives of these classes and their mechanism of action.	
12		Intracellular localization of enzymes. Isoenzymes.	
13		Regulation of enzymatic activity. Allosteric enzymes, their mechanism of action.	
14		Regulation of enzyme biosynthesis.	
15		Induction and repression of enzyme synthesis.	

Recommended Sources

TEXTBOOK(S)

1. **"Enzyme Structure and Function"** by Trevor Palmer
2. **"Fundamentals of Enzymology: The Cell and Molecular Biology of Catalytic Proteins"** by Nicholas C. Price and Lewis Stevens

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			

Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**İmmunology**
Course Unit Code	**İF-B17**
Type of Course Unit	Selection
Level of Course Unit	
National Credits	-
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	Sevinj Nuriyeva
Name of Lecturer (s)	Sevinj Nuriyeva
Name of Assistant (s)	-
Mode of Delivery	Face to face
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: This subject deals with studying specific immunity, information about antigens and antibodies, the mechanism and dynamics of antibody formation, immunoprophylaxis and immunotherapy methods, morpho-biological characteristics, ecology, pathogenicity factors of a number of microorganisms that cause human disease, the mechanism of infection, pathogenesis, laboratory diagnostic methods, specific treatment and prevention of infectious diseases. This subject deals with studying the general morpho-biological characteristics, ecology of microorganisms that cause human disease, microorganisms that are considered sanitary indicators, pathogenicity factors of microorganisms, the characteristics of the effect of various factors on microorganisms, the mechanism of infection, pathogenesis, microbiological examination methods.	
Objectives of the Course: The main goal of the subject is to study in depth the mechanisms of the body's response to foreign bodies, the rules for collecting and sending pathological material, disinfection and sterilization methods, the general structure and biological properties of microorganisms, their interaction with the human body in nature, and to become familiar with	

microbiological research methods.			
69. Operations of the oil and gas industry across the value chain 70. Relationships and interactions between industry players 71.Importance of oil and gas in the economy 72. Likely future scenarios for the industry			
Learning Outcomes: Students should know the general characteristics of microorganisms, methods of identification of microorganisms, the mechanism of the infectious process they cause,			
At the end of the course the student will be able to			Assessment
1	be able to make microbiological diagnosis using examination methods.		
2	Students should master the basics of immunoprophylaxis and immunoprophylaxis, know the characteristics of pathogenic microorganisms, the mechanism of the infectious process they cause,		
3	be able to select, take and send pathological materials in various diseases, methods of disinfection and sterilization;		
4	be able to make microbiological diagnosis using examination methods.		
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz			
Course's Contribution to Program			
			CL
1	Oral and written communication skills in Azerbaijani in the specialty;		
2	Communication skills in at least one foreign language in the specialty;		
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;		
4	The ability to identify threats and challenges faced by our national state;		
5	The ability to use information technologies in the workplace;		
6	The ability to collect and store information, create a database;		
7	The ability to work in a team, achieve a common approach to problem solving;		
8	The ability to adapt to new conditions, take initiative and the will to succeed;		
9	The ability to identify and select additional information resources for solving problems;		
10	The ability to analyze, summarize and apply relevant information for professional purposes;		
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
Course Contents			
Week	Chapter	Topics	Exam
1		Immunology. The evolution of immunity. Phylogenetic and ontogenetic development of the immune system	
2		Structure of the immune system. Organs, tissues and cells of the immune system	
3		Immunity, its main functions and types	
4		The process of phagocytosis	
5		Establishment and stages of the immune response	
6		Teaching about infection. Conditions for the onset of the infection	

		process. Pathogenicity factors of microorganisms	
7		Antigens, structure and types. Properties of antigens. Classification of antigens. Tissue histocompatibility complex	
8		Immunoglobulins, molecular structure, classes. Isotypes, allotypes and idiotypes of immunoglobulins	
9		Immunoglobulins. Theories of the formation of antibodies, formation and proliferation, genetics of formation	
10		Cellular immunity. Mechanism of cellular immunity. Mediators of cellular immunity	
11		Primary and secondary immunodeficiency states	
12		Immune system and pathology. Types of pathological reactivity	
13		Autoimmune diseases. Tissue and organ specificity of autoimmune processes	
14		Acquired immunodeficiency syndrome (AIDS)	
15		Transplant immunity. Types of transplantation	

Recommended
Sources
TEXTBOOK(S)

1. A.A.Əyyubova, G.M. Nəsrullayeva. "İmmunologiya". Bakı 2006
2. A.A.Əyyubova, G.M. Nəsrullayeva. "Klinik immunologiya". Bakı 2007
3. T.Ş.Həsənov. "İmmunologiya və enzimologiya". Bakı 2009

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			

Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Molecular biology**
Course Unit Code	**İF-B19**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	7
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Phd.Nigar Huseynova
Name of Lecturer (s)	Phd.Nigar Huseynova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: Molecular biology is one of the fundamental subjects in the biological education system. Modern molecular biology is closely related to biochemistry, genetics, microbiology, and other biological disciplines and constitutes the methodological basis for studying the vital activity of cells and multicellular organisms at the molecular level.	
Objectives of the Course: The goal of the molecular biology course is to form a comprehensive system of knowledge in students about the structure and properties of biological macromolecules, as well as about the molecular mechanisms underlying the activity of living cells and multicellular organisms (metabolism of biological macromolecules - DNA, RNA, proteins, intracellular regulation and intercellular signaling, etc.).	
73. Operations of the oil and gas industry across the value chain 74. Relationships and interactions between industry players 75.Importance of oil and gas in the economy	

76. Likely future scenarios for the industry		
Learning Outcomes: Formation of knowledge about the structure of DNA and RNA, which are the material basis of heredity, genes and the mechanism of their functioning.		
At the end of the course the student will be able to		Assessment
1	Formation of an understanding of molecular biology.	
2	Formation of students' ideas about the goals and objectives of their training.	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		
Course Contents		

Week	Chapter	Topics	Exam
1		History, subject, main fundamental scientific discoveries of molecular biology	
2		Nucleic acids: chemical composition, structure, functions	
3		Nucleic acids: chemical composition, structure, functions	
4		Levels of structure and functions of proteins.	
5		Watson-Crick model of DNA structure. DNA polymorphism. Some physicochemical properties.	
6		Extranuclear DNAs.	
7		Various mechanisms of DNA replication of prokaryotes and eukaryotes.	
8		Common and different aspects of the organization of prokaryotic and eukaryotic genomes	
9		Organization of the genome of viruses.	
10		Genome redundancy, C-value phenomenon	
11		Chromosome structure, histone and non-histone proteins, their functions, condensation-packaging stages.	

12		Transcription: general principles (in prokaryotic and eukaryotic organisms) and regulatory mechanisms	
13		Maturation-processing of mRNA in eukaryotes: splicing and spliceosome, alternative and trans splicing, capping and polyadenylation.	
14		Processing of nRNA and rRNA	
15		Stages of translation, structure of ribosomes and formation of ribosomal subunits, concept of nucleolus	
16		Different methods of repair and their molecular mechanisms.	
17		Structure and functions of the plasma membrane	
18		Apoptosis (programmed cell death)	
19		Mutation and mutagenesis	
20		Molecular diagnostics of human diseases	
21		Molecular structure of lipids	
22		Molecular structure of carbohydrates	
23		Modern problems, achievements and prospects of molecular biology	

Recommended
Sources
TEXTBOOK(S)

1. Royle SJ. **The Digital Cell: Cell Biology as a Data Science**. 1st ed. Oxford: Oxford University Press; 2020.
2. Watson JD, Baker TA, Bell SP, Gann A, Levine M, Losick R. **Molecular Biology of the Gene**. 7th ed. San Francisco: Pearson; 2014.
3. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. **Molecular Biology of the Cell**. 6th ed. New York: Garland Science; 2014.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)

Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**210**
Total Workload/30(h)			**210\30**
ECTS Credit of the Course			**7**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Bioinformatcs**
Course Unit Code	**İF-B20**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	PhD.Vagif Amikishiyev
Name of Lecturer (s)	PhD.Vagif Amikishiyev
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: This course introduces the fundamental concepts and practical applications of bioinformatics, an interdisciplinary field that combines biology, computer	

science, and statistics to analyze and interpret biological data. Students will explore key areas such as DNA and protein sequence analysis, genome annotation, database searching, multiple sequence alignment, and molecular phylogenetics. Emphasis will be placed on the use of bioinformatics tools and software for analyzing genomic and proteomic data, including BLAST, Clustal Omega, and genome browsers. The course also covers basic scripting and data handling techniques to enable students to manage and analyze large-scale biological datasets. Through lectures, hands-on exercises, and projects, students will gain skills in applying computational approaches to biological questions in research and biotechnology.

Objectives of the Course: This course aims to provide students with a foundational understanding of bioinformatics and its applications in modern biological and biomedical research. Students will become familiar with key biological databases and learn how to retrieve, interpret, and analyze sequence and structural data. The course offers hands-on experience with widely used bioinformatics tools for sequence alignment, gene and protein annotation, database searching, and phylogenetic analysis. Learners will develop practical skills in genomic and proteomic data analysis, including the identification of genes, regulatory elements, and protein domains. Basic programming and scripting techniques using languages such as Python or R will be introduced to support data processing and visualization. Students will explore computational approaches in systems biology, including gene expression analysis and biological network modeling. The course also covers the algorithmic foundations of bioinformatics tools and introduces emerging applications such as personalized medicine and synthetic biology. Emphasis is placed on enhancing critical thinking and problem-solving abilities through real-world case studies and projects, while also addressing ethical, legal, and privacy concerns associated with biological data analysis.

77. Operations of the oil and gas industry across the value chain
78. Relationships and interactions between industry players
79. Importance of oil and gas in the economy
80. Likely future scenarios for the industry

Learning Outcomes: Explain the fundamental concepts of bioinformatics and its significance in biological and medical research.
Navigate and utilize major biological databases to retrieve nucleotide and protein sequences and associated metadata.
Apply bioinformatics tools for sequence alignment, gene and protein annotation, and phylogenetic tree construction.

At the end of the course the student will be able to		Assessment
1	Analyze genomic and proteomic data to identify functional elements such as genes, motifs, and protein domains.	
2	Write basic scripts in Python or R to manipulate, visualize, and interpret biological data sets.	
3	Interpret gene expression data and biological networks using computational and statistical approaches.	
4	Evaluate the principles behind key bioinformatics algorithms, including those used for sequence comparison and data mining.	
5	Solve real-world biological problems through independent data analysis and project work.	

6	Discuss current trends and technologies in bioinformatics, such as next-generation sequencing and personalized genomics.	
7	Identify and assess ethical and privacy issues in the storage, sharing, and use of biological and genomic data.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Main stages of the development of molecular biology. Major discoveries. Proof of the genetic role of nucleic acids.	
2		Genetic code. Properties of the genetic code.	
3		The "central dogma" postulate of molecular biology.	
4		Transcription, translation, alternative splicing.	
5		Bioinformatics as a new scientific field and a new era: history, subject, definition, achievements, and main directions	
6		Concepts of gene, genome, and genotype.	
7		Structure and functions of proteins, proteome.	
8		Reading the human genome: achievements, challenges, and prospects.	
9		Sequencing. Sanger method, NGS (Next-Generation	

		Sequencing).	
10		Bioinformatics databases.	
11		Bioinformatics resources.	
12		Genomics and its various branches.	
13		Key issues in computational biology.	
14		Sequence alignment algorithms and software.	
15		The BLAST program and its different search types.	

Recommended Sources

TEXTBOOK

1. **"Bioinformatics: Sequence and Genome Analysis"**-*David W. Mount*
2. **"Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids"**-*Richard Durbin, Sean R. Eddy, Anders Krogh, Graeme Mitchison*
3. **"Bioinformatics Data Skills: Reproducible and Robust Research with Open Source Tools"**-*Vince Buffalo*
4. **"Introduction to Bioinformatics-** *Arthur M. Lesk*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			

Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Civil Deferense**
Course Unit Code	**İF-B23**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Elshan Amrahov
Name of Lecturer (s)	Elshan Amrahov
Name of Assistant (s)	-
Mode of Delivery	
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Azerbaijan, as a sovereign state, solves all problems in the field of security itself, therefore, when developing a security doctrine, two important aspects should be taken into account. First, we must remember how many nuclear arsenals exist, their threat to this or that country should be taken into account, and this factor should be taken into account in security programs. Second, we must not forget that our country borders on states that possess nuclear weapons or have nuclear ammunition reserves on their territory. Therefore, when planning and implementing Civil Defense (CD) measures, attention should not be reduced to protecting the population, as well as national economic facilities, from weapons of mass destruction (WMD). The security system faces the problem of protection from man-made and natural disasters.

Objectives of the Course: Civil Defense (CD) is a science about protecting human safety and health in the environment. It should reveal and determine dangerous and harmful factors, study methods and means of human protection, ways to reduce harmful and dangerous factors to a minimum, and develop measures to eliminate the consequences of accidents and disasters occurring

in peacetime and wartime.
Emergency events that cause great material losses and human casualties show that the CD measures, especially for emergencies of peacetime origin, should be reviewed and evaluated. Civil defense of the Republic of Azerbaijan is a system of measures implemented by state authorities, legal entities and individuals in order to ensure the safety of the population and its territory in peacetime and wartime.

Learning Outcomes

	At the end of the course the student will be able to	**Assessment**
1	Formation of ideas about the methodology, goals and objectives of teaching the Civil-Defense subject, scientific-research methods, and its relationship with other sciences;	
2	Formation of ideas about the means of teaching the Civil-Defense subject;	
3	Formation of ideas about the forms of organizing the Civil-Defense subject;	
4	Formation of ideas about the goals and objectives of teaching the Civil-Defense subject, scientific-research methods, and its relationship with other sciences;	
5	Formation of ideas about the forms of organizing the Civil-Defense subject;	
6	Formation of ideas about the principles of Civil-Defense training, training methods;	
7	Formation of the ability to make logical judgments, draw conclusions, and justify them.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		The concept of civil defense, its history, role, tasks and organization of training of the population in the field of protection from emergencies. Promotion of civil defense knowledge	
2		Classification of emergencies.	
3		Concept of weapons of mass destruction. Nuclear weapons and their damaging factors. Conventional means of destruction.	
4		Basic characteristics of radiation chemical reconnaissance and dosimetric devices and rules for their use.	
5		Rules for the use of personal protective equipment in emergencies.	
6		Basic principles and methods of population protection in emergencies. Collective protection devices	
7		Evacuation of the population in emergencies.	
8		Carrying out rescue and other urgent (Emergency and Disaster Management) work.	

Recommended
Sources
TEXTBOOK(S)

1. **"Civil Defense and Emergency Situations"**-Ismayil Ismayilov
2. **"Civil Defense: Training and Educational Manual"**-Sattarov N.M.
3. **"Protection of the Population and Territories from Emergencies"**-Ramiz Mammadov
4. **"Civil Defense and Life Safety"**-Shahin Ahmadov
5. **"Civil Defense Instruction Manual"**-Collective (Prepared by employees of the Ministry of Emergency Situations of the Republic of Azerbaijan)

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria Final grades are determined according to the Academic Regulations of WCU			
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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**90**
Total Workload/30(h)			**90\30**
ECTS Credit of the Course			**3**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Mechanics and mathematics".

Course Unit Title	**Biophysics**
Course Unit Code	**İF -B22**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Ilham Salimov
Name of Lecturer (s)	Ilham Salimov
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English

Prerequisites	-
Recommended Optional Program Components	-

Course description:
The discipline of biophysics studies the physical properties of an object and the physical and chemical processes occurring in it at the level of a complex system, individual organs, tissues, individual cells, various structures of cells, macromolecules, and finally, the electronic structure of biologically important macromolecules, the characteristics of biological kinetics, the application of the laws of thermodynamics in biology, and the role of membranes in the implementation of vital processes. Physical foundations of hemodynamics. Physical foundations of acoustics. Thermodynamics of biological processes. Biological effect of electric current. Energy characteristics of light, biological effect of optical radiation. Biophysics of vision.

Objectives of the Course: Explain the important role and place of biophysics. Identify the physical and chemical mechanisms of physiological processes occurring in biological systems. Teach the laws of membrane processes occurring in living systems, the biophysical mechanism of the influence of a number of physical and chemical factors of the environment on living systems. Use biophysical methods in the diagnosis of diseases that occur as a result of disruption of the physiological and biophysical processes that form the basis of the organism.

Learning Outcomes

At the end of the course the student will be able to		**Assessment**
1	An important aspect of physics lectures is that real and computer-based physical experiments should be conducted, educational films, and model computer programs should be used.	
2	As a rule, in seminars, theoretical materials requiring complex mathematical apparatus and various methods of solving problems are considered.	
3	Students can receive various types of homework to consolidate the materials received in seminars.	
4	They will practically comprehend the subject by performing laboratory work	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	

10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Premises and stages of development of biophysics, history of formation. Relationship of biophysics with other sciences. Kinetic behavior of biological systems. Importance of biophysics in medicine. Problems of modern biophysics. Role of modern biophysics in technology. Principle of automatic regulation in living systems. Stationary states of living systems. Modeling of biological processes. Biological triggers.	
2		Kinetics of fermentative processes. Dependence of the rate of biological processes on temperature. Thermodynamics of biological processes. Heat balance of living organisms. Heat transfer in living organisms. Physical mechanisms of heat regulation. Physical mechanisms of thermoregulation. Stationary states in an open system. Influence of microclimate on the human body. Mechanism of temperature change in the human body. Influence of gravitational field on biological objects.	
3		Structure of biological membrane. Modern ideas about the structure of biological membrane. Chemical potentials in the transport of substances in biological membranes. Membrane dynamics. Diffusion in membranes. Active transport of substances in membranes. Filtration and osmosis	
4		Principles of regulation in biological systems. Biophysics of complex systems. Properties of cybernetic systems. The principle of automatic regulation in living systems. Information flows in living systems	
5		Modeling of biological processes. Model of population growth. Reasons for population decline. Predator-Prey model	
6		Specific physical fields of a person. Biological effect of electric current. Electrotherapy. Direct current in biological objects. Physiological effect of direct current. Biological effect of alternating current. Electrical properties of tissues of an organism Electric field of the human body. Effect of alternating electric field on biological objects. Effect of impulse current on biological objects. Physical fields of a person and psychics	
7		The effect of a magnetic field on the human body. Physiological mechanisms of a magnetic field. Mechanisms of therapeutic action of a magnetic field. Effect of a magnetic field on biological objects. Specific electromagnetic field of the human body. Mechanism of action of a magnetic field. Effect of a magnetic field on biological objects	
8		The specific acoustic field of the human body. Physical	

		foundations of acoustics. Sound-physical phenomena. Sound sources and receivers. Biophysics of infrasound. Biophysics of ultrasound. Biological effect of ultrasound. Effect of ultrasound on biological objects. Biological acoustics. Doppler effect. Sound as a psychophysical phenomenon	
9		Photobiological processes and their effect on the human body. General scheme of photosynthesis. Mechanism of photosynthesis and its phases. General scheme of photosynthesis. Mechanism of action of chlorophyll in the process of photosynthesis	
10		Types of photochemical reactionsLuminescence phenomenon. Photophysical stages of photosynthesis. Photosynthesis as an electronic process. The role of light in the process of photosynthesis. Photoreceptors of the organ of vision. Molecular foundations of vision. The eye and its optical power. Biophysics of vision	
11		The phenomenon of photoeffect and its role in human life. Photon and its properties. The process of light absorption. The role of light dispersion in human lifeInfrared and ultraviolet radiation. Physical properties of laser radiation. Biological effect of laser radiation	
12		Electromagnetic nature of light. Biological effect of optical radiation. Energy characteristics of light. The effect of light sources on the human body. The effect of electromagnetic radiation in the optical range on biological objects. The effect of the electromagnetic field on a living organism. The mechanism of action of electromagnetic waves on a person, biomechanism.	
13		The specific electromagnetic field of the human body	
14		About muscles and muscle activity. About muscle tension. Inactive muscle tension. The principle of operation of the skeletal and cardiac muscles. The structure of striated muscles. The principle of operation of muscles. The biomechanism of muscle activity. Muscle strength and muscle fatigue	
15		Hemodynamics. The role of hemodynamics in human life. The main hemodynamic indicators of blood flow. Biophysics of the circulatory system. Blood flow regime in the vessels. Hydrodynamics of an ideal fluid. Physical properties of blood. Dynamics of blood movement in capillaries	
16		Lab 1: Measurement of Membrane Potential in Plant or Animal Cells	
17		Lab 2: Diffusion and Osmosis in Living Cells	
18		Lab 3: Effect of Temperature on Enzyme Kinetics	
19		Lab 4: Investigation of Heat Transfer in Living Tissues	
20		Lab 5: Electrocardiography (ECG): Electrical Activity of the Heart	
21		Lab 6: Measurement of Human Reaction to Ultrasound	
22		Lab 7: Examination of Light Absorption in Photosynthetic Pigments	
23		Lab 8: Doppler Effect in Biological Systems (Blood Flow Monitoring)	

24		Lab 9: Measurement of Muscle Strength and Fatigue Over Time	
25		Lab 10: Electrical Conductivity of Biological Tissues	
26		Lab 11: Effect of Magnetic Fields on Seed Germination or Cell Growth	
27		Lab 12: Investigation of Infrared Radiation's Effect on Skin Temperature	
28		Lab 13: Simulation of Population Growth Using a Logistic Growth Model	
29		Lab 14: Measurement of Light Intensity and Its Biological Effects	
30		Lab 15: Modeling the Flow of Blood Through Artificial Vessels	

Recommended Sources

TEXTBOOK(S)

1. **Biophysics: An Introduction"**-Roland Glaser
2. **"Molecular and Cellular Biophysics"**-Meyer B. Jackson
3. **"Biophysics: Searching for Principles"**-William Bialek
4. **"Biophysics of Computation: Information Processing in Single Neurons"**-Christof Koch

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**

Total Workload/30(h)	**150\30**
ECTS Credit of the Course	**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Biotechnology**
Course Unit Code	**İF-B21**
Type of Course Unit	Compulsory
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	phD Ayaz Mammadov
Name of Lecturer (s)	phD Ayaz Mammadov
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azərbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:
It aims to teach undergraduate students how to achieve achievements in various fields (food, bioenergy, biodiesel, environment, medicine, agriculture, etc.) through the application of modern biotechnology, and to equip students with future research methods in this direction.

Objectives of the Course:
To provide undergraduates with information about modern biotechnology science, its various fields and applications.

Learning Outcomes
Operations of the oil and gas industry across the value chain. Relationships and interactions between industry players. Importance of oil and gas in the economy. Likely future scenarios for the industry

At the end of the course the student will be able to		Assessment
1	-Further increase in knowledge about the history of the development of biotechnology, its subject and tasks;	
2	-Acquiring knowledge about individual areas of biotechnology;	
3	-Deeply mastering biotechnology methods;	
4	-Acquiring information about the legal and ethical aspects of biotechnology;	

5	-Further increase in knowledge about the history of the development of biotechnology, its subject and tasks;	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Topic № 1. Biotechnology and its Development Perspectives	
2		Topic № 2. Nanobiotechnology	
3		Topic № 3. Microclonal Propagation of Plants through Tissue Culture	
4		Topic № 4. Biotechnology of Microbial Synthesis Product Production	
5		Topic № 5. Application of Biotechnologically Derived Additives and Ingredients	
6		Topic № 6. Biotechnological Production of Substances and	

		Compounds Used in the Food Industry	
7		Topic № 7. Biotechnology of Products Derived from Plant-Based Raw Materials	
8		Topic № 8. Production of Microorganism Biomass	
9		Topic № 9. Biotechnology of Food Products Derived from Animal-Based Raw Materials	
10		Topic № 10. Application of Biotechnologically Derived Additives and Ingredients	
11		Topic № 11. Bioenergetics	
12		Topic № 12. Cell Biotechnology	
13		Topic № 13. Biotechnology of Vaccine Production	
14		Topic № 14. Biotechnology of Antibiotic Production	
15		Topic № 15. Ecological Aspects of Biotechnology	

Recommended
Sources
TEXTBOOK(S)

1. Ağayeva E.M. Biotexnologiya və gen mühəndisliyi.Bakı Çaşoğlu nəşriyyatı, 2010. 618 səh.
2. Ahmet Yıldırım, Fevzi Bardakçı, Mehmet Karataş, Bahattin Tanyolaç. Moleküler bioloji. İstanbul, Nobel Bilim ve Araştırma Merkezi, 2010.686 s.
3. "Gene cloning and DNA analysis." T.A.Brown, sixth edition. 2011 Wiley-Blackwell Publishing

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			

Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Geobotany**
Course Unit Code	**ATMF-BO2**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	PhD.Lala Gurbanova
Name of Lecturer (s)	PhD.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: Geobotany aims to form modern ecosystem views in students by mastering the important environmental shaping role of plants in ecosystems based on scientific knowledge. This course, in addition to providing students with knowledge about the anatomical and morphological structure of plants, their systematics, importance, and use in agriculture, also involves conducting botanical practicum. It is impossible to obtain high quality indicators at the modern level without knowing the methodological foundations. The teaching of the subject is closely related to such subjects as ecology, physics, chemistry, biochemistry, and mathematics. Therefore, throughout the course, we will try to study issues that meet the requirements of the modern era.	
Objectives of the Course: This course aims to provide students with a comprehensive understanding of geobotany, focusing on the relationships between vegetation and environmental	

factors such as climate, soil, and topography. Students will explore the spatial distribution of plant communities and learn to analyze their ecological and geographical patterns across various biomes and regions. The course introduces methods for vegetation classification, mapping, and analysis, including both field-based surveys and remote sensing techniques. Emphasis is placed on understanding how abiotic and biotic factors influence plant distribution, diversity, and adaptation at different scales. Students will examine the role of vegetation within ecosystems and its interactions with climate, hydrology, and human activity. Through hands-on fieldwork and data interpretation, students will develop skills in species identification, vegetation sampling, and environmental data analysis. The course also highlights the significance of vegetation in biodiversity conservation, land use planning, and sustainable ecosystem management. Additionally, students will critically assess the impacts of global changes such as climate change and land degradation on plant geography, and apply geobotanical knowledge to real-world challenges in conservation, agriculture, and environmental monitoring.		
81. Operations of the oil and gas industry across the value chain 82. Relationships and interactions between industry players 83.Importance of oil and gas in the economy 84. Likely future scenarios for the industry		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	Students' mastery of the characteristic features, classification of phytocenoses, mutual relations between plant groups that make up phytocenoses and between these groups and the environment;	
2	Study of the basics of ecophytocenology, ecological system and biogeocenosis, types of vegetation and their regular distribution;	
3	Teaching extensive materials on the flora and vegetation of Azerbaijan, phytocenology and environmental protection;	
4	Basic methods of phytocenological research, determination of the rules for conducting field research when studying grassy plant cenoses.	
5	Demonstrate knowledge of plant community classification and ecosystem types across different geographical regions.	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	

9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction. Fundamentals of geobotany	
2		History, subject, purpose and objectives of the study of geobotany	
3		Characteristics of phytocenoses	
4		Classification of phytocenoses	
5		Main features of mutual relations in phytocenoses	
6		Main methods of phytocenological research	
7		Methodology of studying cenoses of herbaceous plants	
8		Ecological systems and biogeocenosis	
9		Life forms of plants	
10		Synecology and population dynamics. Fundamentals of phytocenology	
11		Ecology of phytocenosis	
12		Flora and vegetation. Main types of vegetation cover and regular distribution	
13		Floristic regions of the Earth	
14		Flora and vegetation of Azerbaijan	
15		Phytocenology and environmental protection	

Recommended Sources

TEXTBOOK(S)

1. **Geobotany: Plants and Vegetation in Relation to Geology"** - Sergei D. Ivanov
2. **"Principles of Geobotany"** - Walter Oberdorfer
3. **"Vegetation Ecology"** - Michael J. Crawley
4. **"Phytogeography: An Introduction to the Geographical Distribution of Plants"** - Ronald Good
5. **"Biogeography and Ecology of Southern Africa"** edited - Alexander S. van Wyk and Paul Prins

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU			
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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Hydrobiology**
Course Unit Code	**ATMF -BO4**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Konul Ahmadova
Name of Lecturer (s)	Konul Ahmadova
Name of Assistant (s)	-
Mode of Delivery	Full Time

Language of Instruction	Azerbaijani, English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
"Hydrobiology course" is one of the main fundamental biological subjects, and is taken by students in the third year of study. The material of this course covers all aquatic animals, provides information about their characteristic features and classification, evolution, structural features of individual organ systems, their ecology, ethology, role and importance in the biocenosis. The protection of endangered animals, disturbing factors, preservation of biological diversity, efficient use of animals, etc. are mastered.

Objectives of the Course: The main goal of the course is to get to know aquatic animals, examine their origin and evolution, the main features of their historical development, and acquire knowledge about the conservation of aquatic animals, their current status, the current status of their habitats, the reasons for their decline, their importance in nature and human life, etc.

85. Operations of the oil and gas industry across the value chain
86. Relationships and interactions between industry players
87. Importance of oil and gas in the economy
88. Likely future scenarios for the industry

Learning Outcomes: Learn the scientific, economic, technical, educational, medical, aesthetic, as well as nature-related importance of aquatic animals, the attitude of the population to vertebrates (especially predators and game animals) in the past and present, the place in the classification of the studied object, its scientific name, biological characteristics and the ecological group to which it belongs;

At the end of the course the student will be able to		Assessment
1	to get acquainted with the subject, goals and objectives of the subject;	
2	to get acquainted with the characteristics and classification of aquatic animals, taxonomic signs;	
3	to learn the methods of studying aquatic animals belonging to various systematic groups;	
4	to get acquainted with the effective use of aquatic habitats, ways of their protection, the importance of regional and international cooperation, species introduced to the local fauna, the reasons for the rarity of animals, etc.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	

7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Subject, tasks and directions of hydrobiology, research methods, general principles and concepts, history of creation. Development of hydrobiology	
2		Hydrosphere as a living environment	
3		External environmental factors and their role in the life of organisms. Interaction of hydrobionts with gases dissolved in water	
4		The role of temperature in the life of hydrobionts	
5		The influence of the active reaction of the environment (pH) on hydrobionts. Interaction of hydrobionts with light	
6		Nutrition and food relations of hydrobionts	
7		Interaction of hydrobionts with organic substances	
8		Interaction of organisms with complex factors of the environment	
9		Biological productivity of water bodies	
10		Hydrobiological regime of oceans	
11		Hydrobiological regime of seas	
12		Hydrobiological regime of rivers	
13		Hydrobiological regime of reservoirs	
14		Hydrobiological regime of lakes	
15		Hydrobiological regime of ponds and artificial lakes. Breeding of live food organisms	

Recommended Sources

TEXTBOOK(S)

1. **"Textbook of Limnology"** by Gerald A. Cole
2. **"Ecology and Classification of North American Freshwater Invertebrates"** by James H. Thorp & Alan P. Covich
3. **"Introduction to Aquatic Insects of North America"** by Richard W. Merritt, Kenneth W. Cummins & Martin B. Berg
4. **"Freshwater Ecology: Concepts and Environmental Applications"** by Walter K. Dodds & Matt R. Whiles
5. **"Fundamentals of Aquatic Ecology"** by R.S.K. Barnes, K.H. Mann, and Peter Calow

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Hydrochemistry**
Course Unit Code	**ATMF-BO2**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-

Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Reyhan Abdullayeva
Name of Lecturer (s)	Reyhan Abdullayeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-

Course description: The course "Hydrochemistry" is intended for students of the natural sciences. These subject studies the chemical properties of natural waters, methods of chemical analysis of waters. During the teaching of the subject of hydrochemistry, students study in detail the hydrochemical characteristics (composition, spatial structure) and hydrochemical regime (changes in their state over time and certain processes) of individual water bodies of the hydrosphere (seas, rivers, lakes, swamps, groundwater, glaciers, as well as groundwater and glaciers). As a regional component, the curriculum of the course includes a detailed hydrochemical description of surface waters in Azerbaijan.

Objectives of the Course: The aim of the course is to develop students' scientific knowledge of the chemical properties of natural waters, including providing an understanding of hydrochemical processes and phenomena in water bodies, forming practical skills in conducting chemical analysis of water and the ability to interpret, analyze and summarize hydrochemical data, and solving problems of hydrochemistry application.

89. Operations of the oil and gas industry across the value chain
90. Relationships and interactions between industry players
91. Importance of oil and gas in the economy
92. Likely future scenarios for the industry

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	To introduce students to the general concepts of hydrochemistry and the general hydrochemical properties of water;	
2	To develop knowledge about the hydrochemical composition of various types of natural waters, paying attention to the regional hydrochemical characteristics of Azerbaijan;	
3	To develop students' practical skills in the chemical analysis of water;	
4	To teach students to solve problems of application of hydrochemistry.	
5	**To Critically assess scientific literature and case studies** related to water quality, contamination, and remediation efforts.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political,	

	cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction. Subject, purpose and objectives of hydrochemistry.	
2		Basic physical and chemical properties of water.	
3		Internal structure of water.	
4		Water as a universal solvent.	
5		General characteristics of the chemical composition of natural waters.	
6		Chemical composition of water: basic ions (macroelements).	
7		Gases dissolved in water.	
8		Biogenic substances included in the composition of water.	
9		Microelements included in the composition of water.	
10		Hydrochemistry of various types of natural water bodies.	
11		Formation of the chemical composition of natural waters.	
12		Hydrochemistry of atmospheric waters and sediments, rivers and lakes. Hydrochemistry of swamps and groundwater.	
13		Regional hydrochemical characteristics of water bodies of Azerbaijan.	
14		Basic methodological principles of hydrochemistry.	
15		Devices and equipment necessary for conducting hydrochemical analyzes.	

Recommended Sources

TEXTBOOK(S)

1. **Hem, J. D. (1985).** *Study and Interpretation of the Chemical Characteristics of Natural Water.*
2. **Stumm, W., & Morgan, J. J. (1996).** *Aquatic Chemistry: Chemical Equilibria and Rates in Natural Waters* (3rd ed.).

3. **Appelo, C. A. J., & Postma, D. (2005).** *Geochemistry, Groundwater and Pollution* (2nd ed.).
4. **Drever, J. I. (1997).** *The Geochemistry of Natural Waters: Surface and Groundwater Environments* (3rd ed.).
5. **Langmuir, D. (1997).** *Aqueous Environmental Geochemistry.*

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**The medicinal plants of Azerbaijan**
Course Unit Code	**ATMF -BO3**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Sevinj Rajabova
Name of Lecturer (s)	Sevinj Rajabova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The curriculum for the subject "Medicinal Plants of Azerbaijan" was developed based on the state requirements for the content and level of bachelor's training set by the state standards of higher specialized education of the Ministry of Education of the Republic of Azerbaijan and in accordance with the requirements of modern educational standards.

Objectives of the Course: The program includes lectures on medicinal plants, as well as medicinally important spices and herbal teas, their importance, cultivation, use in the treatment of diseases, etc.

93. Operations of the oil and gas industry across the value chain
94. Relationships and interactions between industry players
95. Importance of oil and gas in the economy
96. Likely future scenarios for the industry

Learning Outcomes

	At the end of the course the student will be able to	Assessment
1	**Identify and classify major medicinal plant species** native to or commonly found in Azerbaijan.	
2	**Describe the traditional and modern uses** of medicinal plants in Azerbaijani ethnomedicine and pharmacology.	
3	**Understand the phytochemical properties and active compounds** of selected medicinal plants and their roles in therapeutic applications.	
4	**Analyze the ecological distribution and habitat preferences** of medicinal plant species across different regions of Azerbaijan.	

5	**Recognize the importance of conservation and sustainable use** of medicinal plant resources in the context of biodiversity and cultural heritage.	
6	**Evaluate methods of cultivation, harvesting, and processing** of medicinal plants for pharmacological or commercial use.	
7	**Apply basic techniques in field identification and herbarium specimen preparation** for medicinal plant studies.	
8	**Assess the scientific evidence behind the efficacy and safety** of medicinal plant-based treatments.	
9	**Discuss current challenges and opportunities** in the use and regulation of herbal medicines in Azerbaijan and globally.	
10	**Integrate traditional knowledge with modern scientific approaches** to promote responsible and effective use of medicinal plants.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		The plant biodiversity of Azerbaijan.	
2		The general information about the medicinal plants	

3		The scientific basis of supply of the medicinal plant raw materials	
4		The importance of spices, herbal teas and medicinal plants	
5		The multiplication of the medicinal plants	
6		The planting of the medicinal plants	
7		The irrigation of the medicinal plants	
8		The fertilization of the medicinal plants: Mineral	
9		The fertilization of the medicinal plants: Organic	
10		The plant protection measures and regulation of the weeds in the cultivation of the spices, herbal teas and medicinal plants	
11		The planting, harvesting and sale of the spices, herbal teas and medicinal plants	
12		The general acquaintance with the spices, herbal teas and medicinal plants, their grouping	
13		The selection of the market competitive varieties of the spices, herbal teas and medicinal plants	
14		The medicinal forms and the methods of their acquisition	
15		The using of the medicinal plants in the treatment of the diseases	

Recommended
Sources
TEXTBOOK(S)

1. **Əliyev, İ. M.** – *Azərbaycanın dərman bitkiləri*
2. **Əliyeva, F. Ə.** – *Fitoterapiya və dərman bitkiləri*
3. **Kərimov, A.M.** – *Azərbaycan florasının dərman bitkiləri*
4. **Ali-Zade, V.M.** – *Useful Plants of Azerbaijan*.
5. **Aliyev, R. & Rustamov, S.** – *Traditional Medicine and Medicinal Plants of Azerbaijan*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration	Total

		(hour)	Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Flora and fauna of Azerbaijan**
Course Unit Code	**ATMF-BO3**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Reyhan Abdullayeva
Name of Lecturer (s)	Reyhan Abdullayeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: The course on flora and fauna of Azerbaijan consists of theoretical lessons and seminar sessions. During the teaching of the subject, students are taught knowledge such as the taxonomic composition of the plant and animal world, the concept of flora and fauna and the history of its	

study, ecology, plants and animals used by people for various purposes, rare and endangered plant and animal resources, and their protection. The subject is taught by explaining its relationship with other subjects.			
Objectives of the Course: The main goal of teaching the subject is to provide students with information about the flora and fauna of Azerbaijan, as well as its history, the total number of distributed species, as well as the study of their resources, their use, the protection of rare species, and in this regard, ensuring ecological safety and preserving biological diversity.			
Operations of the oil and gas industry across the value chain Relationships and interactions between industry players Importance of oil and gas in the economy Likely future scenarios for the industry			
Learning Outcomes: Know the morphological, geographical and ecological characteristics of the main taxa included in the typical phytocenoses and zoocenoses of Azerbaijan.			
At the end of the course the student will be able to			Assessment
1	Systematically study the characteristics of plant and animal species common in Azerbaijan.		
2	Know the rare, endemic and endangered plant species of our country.		
3	Know the reserves and sanctuaries of Azerbaijan.		
4	Analyze the conservation status of key species and habitats in Azerbaijan, recognizing threats such as habitat loss, pollution, and climate change.		
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz			
Course's Contribution to Program			
			CL
1	Oral and written communication skills in Azerbaijani in the specialty;		
2	Communication skills in at least one foreign language in the specialty;		
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;		
4	The ability to identify threats and challenges faced by our national state;		
5	The ability to use information technologies in the workplace;		
6	The ability to collect and store information, create a database;		
7	The ability to work in a team, achieve a common approach to problem solving;		
8	The ability to adapt to new conditions, take initiative and the will to succeed;		
9	The ability to identify and select additional information resources for solving problems;		
10	The ability to analyze, summarize and apply relevant information for professional purposes;		
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
Course Contents			
Week	Chapter	Topics	Exam
1		General information about the flora and fauna of Azerbaijan.	

2		The concept of flora and the goals and objectives of its study	
3		Training on the biosphere, vegetation of Azerbaijan	
4		Protection and efficient use of the plant world	
5		Flora spectrum of Azerbaijan	
6		Plant types of Azerbaijan	
7		Forests of Azerbaijan, its floristic composition and modern state	
8		Rare plants of Azerbaijan and ways of their protection	
9		Restoration of vegetation in Azerbaijan	
10		The concept of fauna, classification and distribution of the animal world	
11		History of the study of the fauna of Azerbaijan	
12		Physical and geographical characteristics of Azerbaijan	
13		Formation of the fauna of Azerbaijan	
14		Faunistic overview of Azerbaijan	
15		Rare and endangered animals and their protection	

Recommended
Sources
TEXTBOOK(S)

1. **Aliyev, V. (2010).** ***Biodiversity of Azerbaijan: Flora and Fauna*****. Baku: Elm Publishing.**
2. **Mammadov, A. (2015).** ***Ecology and Natural Resources of Azerbaijan*****. Baku: University Press.**
3. **Hasanov, T. & Karimov, S. (2018).** ***Natural History of Azerbaijan: Flora, Fauna and Environment*****. Baku: National Academy of Sciences Publishing House.**

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

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

Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Industrial plants of Azerbaijan**
Course Unit Code	**ATMF-BO3**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	3
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Reyhan Abdullayeva
Name of Lecturer (s)	Reyhan Abdullayeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan, English
Prerequisites	-
Recommended Optional Program Components	-
Course description: The subject "Industrial Plants of Azerbaijan" was developed on the basis of the state requirements for the content and level of bachelor's training set by the state standards of higher specialized education of the Ministry of Education of the Republic of Azerbaijan and in accordance with the requirements of modern educational standards. The program includes lectures on the importance, cultivation, use, etc. of industrial plants.	
Objectives of the Course: The purpose of studying the subject is to form theoretical and practical knowledge based on crop production and industrial crop cultivation technology.	

Operations of the oil and gas industry across the value chain Relationships and interactions between industry players Importance of oil and gas in the economy Likely future scenarios for the industry		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	-to study the basics of plant breeding.	
2	- to know the biology of field crops and the characteristics of the formation of industrial crop productivity in various cultivation conditions;	
3	- to learn how to develop adaptive technologies for the cultivation of technical crops in various agro-landscape and environmental conditions.	
4	**-to identify** the major industrial plant species cultivated or utilized in Azerbaijan and understand their economic importance.	
5	**-to explain** the botanical, ecological, and agronomic characteristics of key industrial plants (e.g., cotton, tobacco, grapevine, sunflower, flax, safflower	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		
Course Contents		

Week	Chapter	Topics	Exam
1		Plant biodiversity of Azerbaijan	
2		General information on industrial plants	
3		Scientific basis of industrial plant raw material supply	
4		Importance of industrial plants	

5		Reproduction of industrial plants	
6		Planting of industrial plants	
7		Fertilization of industrial plants	
8		Plant protection measures and weed control in industrial plant plantations	
9		Main groups of industrial plants	
10		Oil plants	
11		Sugar plants	
12		Fiber plant plantations	
13		Cotton plant	
14		Essential oil plants	
15		Plants used in paint and paper production	

Recommended
Sources
TEXTBOOK(S)

1. **"Agronomy of Industrial Crops"** – Author: Local or regional agronomy specialists
2. **"Cotton Growing in Azerbaijan"** – Author: Agricultural Research Institutes
3. **"Medicinal and Industrial Plants of Azerbaijan"** – Author: Azerbaijani Botanists
4. **"Plant Resources of Azerbaijan"** (FAO/UNDP Report or local university publication)

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			

Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Biochemistry of hormones**
Course Unit Code	**ATMF-BO4**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Natavan Karamova
Name of Lecturer (s)	Natavan Karamova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

This course provides an in-depth exploration of the biochemical nature, synthesis, regulation, and mechanisms of action of hormones in animals and humans. It covers major classes of hormones, including peptide, steroid, and amino acid-derived hormones, and examines their roles in maintaining physiological homeostasis. Students will study hormonal control of key biological processes such as metabolism, growth, reproduction, stress response, and fluid balance. The course also emphasizes hormone-receptor interactions, signal transduction pathways, feedback mechanisms, and the integration of endocrine and neuroendocrine systems. Clinical aspects of hormonal imbalances and endocrine disorders are also discussed to link theory with medical relevance. Through lectures, case studies, and literature analysis, students will develop a strong understanding of how hormones function at the molecular level and how biochemical principles are applied in endocrinology and biomedical research.

Objectives of the Course: The course "Biochemistry of Hormones" reflects a theoretical and methodological approach for a broad and comprehensive study of normal and pathological processes occurring in the human body, which is the object of scientific research. The main goal

of the course is to study the highest being, the human being, at the level of the organism and to analyze the indicators that are important for health. By studying this course, students will understand the human body as a single system. Thus, this specialty course aims to provide students with deeper knowledge about the functional organization of the body, enabling them to understand medicine, genetics, applied biology and diagnostics, as well as other related fields of science, in the future, and to increase their intellectual level.

Operations of the oil and gas industry across the value chain
Relationships and interactions between industry players
Importance of oil and gas in the economy
Likely future scenarios for the industry

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	About the subject of hormone biochemistry.	
2	General properties of hormones and methods of studying	
3	Classification of hormones.	
4	Mechanism of action of hormones.	
5	Structure and biological role of hormones	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		About the subject of biochemistry of hormones. General properties of hormones and methods of study	
2		Classification of hormones.	
3		Mechanism of action of hormones.	

4		Structure and biological role of hormones	
5		Properties of hormones of the pituitary gland	
6		Properties of hormones of the hypothalamus	
7		Properties of hormones of the thyroid gland	
8		About hormones of the parathyroid gland.	
9		Properties of hormones of the pancreas	
10		Adrenal gland and hormones	
11		About sex glands and hormones	
12		Placenta and hormonal activity	
13		Properties of hormones of the thymus gland	
14		Hormones of the pineal gland	
15		Biologically active substances with hormone-like effect	

Recommended
Sources
TEXTBOOK(S)

1. **Hadley, M.E. & Levine, J.E.** – *Endocrinology* (6th Edition)
2. **Nussey, S. & Whitehead, S.** – *Endocrinology: An Integrated Approach*
3. **Guyton, A.C. & Hall, J.E.** – *Textbook of Medical Physiology* (14th Edition)
4. **Becker, K.L. (Ed.)** – *Principles and Practice of Endocrinology and Metabolism* (3rd Edition)
5. **Berne, R.M., Levy, M.N., Koeppen, B.M., Stanton, B.A.** – *Physiology* (6th Edition)

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			

Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Functional biochemistry**
Course Unit Code	**ATMF-BO4**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Natavan Karamova
Name of Lecturer (s)	Natavan Karamova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: Biochemistry is the science that studies the chemical composition, properties, and transformations of substances in living organisms. It is generally divided into **static**, **dynamic**, and **functional** biochemistry. Static biochemistry focuses on the chemical structure of biological compounds, dynamic biochemistry studies metabolic processes and their products, while functional biochemistry explores the chemical principles underlying organ and organism functions. These branches are closely interconnected. Biochemistry is further categorized based on the subject of study: human and animal, plant, or microbial biochemistry — each with its specific features. **Functional biochemistry** is both a theoretical and practical discipline.	
Objectives of the Course: The course "Functional Biochemistry" reflects a theoretical and	

methodological approach for a broad and comprehensive study of normal and pathological processes occurring in the human body, which is the object of scientific research. The main goal of the course is to study the highest being, the human being, at the level of the organism and to analyze the indicators that are important for health. By studying this course, students will understand the human body as a single system. Thus, this specialty course aims to provide students with deeper knowledge about the functional organization of the body, enabling them to understand medicine, genetics, applied biology and diagnostics, as well as other related fields of science, in the future, and to increase their intellectual level.

Operations of the oil and gas industry across the value chain
Relationships and interactions between industry players
Importance of oil and gas in the economy
Likely future scenarios for the industry

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Functional biochemistry as a science	
2	Biochemical properties of blood	
3	Biochemistry of blood cells and homeostatic function of blood	
4	Biochemistry of metabolic processes in the liver	
5	Biochemistry of metabolic processes in the liver	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Functional biochemistry as a science	
2		Biochemical properties of blood	

3		Biochemistry of blood cells and homeostatic function of blood	
4		Biochemistry of the exchange process in the liver	
5		Biochemical properties of pigment metabolism in the liver	
6		Biochemical characteristics of metabolism in the kidneys	
7		Biochemical properties of connective tissue	
8		Biochemical processes in bones	
9		Biochemical functions and significance of muscles	
10		Biochemistry of the nervous system	
11		Biochemistry of amino acid, peptide and protein metabolism in neurons	
12		Peculiarities of biochemical processes in sensory organs	
13		Biochemistry of the digestive system	
14		Hormones and biochemical characteristics	
15		Peculiarities of the relationship between pathological processes and functional biochemistry. Medical diagnostic significance of functional biochemistry.	

Recommended
Sources
TEXTBOOK(S)

1. **Devlin, T.M.** – *Textbook of Biochemistry with Clinical Correlations* (7th Edition)
2. **Murray, R.K., et al.** – *Harper's Illustrated Biochemistry* (31st Edition)
3. **Lehninger, A.L., Nelson, D.L., Cox, M.M.** – *Lehninger Principles of Biochemistry* (8th Edition)
4. **Ferrier, D.R.** – *Biochemistry (Lippincott's Illustrated Reviews)* (7th Edition)
5. **Voet, D. & Voet, J.G.** – *Biochemistry* (5th Edition)

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration	Total

		(hour)	Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Endocrinology**
Course Unit Code	**ATMF-BO4**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
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	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: The main goal of the subject "Endocrinology" is to teach students the etiology and pathogenesis of nosological forms of endocrine diseases. To strengthen the skills of examining endocrine patients in students. To increase students' knowledge of typical, atypical and rare forms of the main diseases and syndromes in endocrine pathologies.	
Objectives of the Course: The main goal of teaching the subject "Enzymology" is to provide students with information about the characteristics, properties, classification, naming, mechanism of action, ways to regulate their activity, as well as areas of application of enzymes, and to familiarize students with the main problems of enzymology.	

Operations of the oil and gas industry across the value chain Relationships and interactions between industry players Importance of oil and gas in the economy Likely future scenarios for the industry		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1	**Describe the anatomy and physiology of endocrine glands** and the hormones they produce.	
2	**Explain the mechanisms of hormone action**, including hormone-receptor interactions and signal transduction pathways.	
3	**Recognize the clinical symptoms and biochemical basis** of common endocrine disorders such as diabetes, thyroid diseases, and adrenal dysfunction.	
4	**Interpret diagnostic tests and hormone assays** used in endocrinological evaluation.	
5	**Evaluate the pharmacological approaches** to treating endocrine imbalances and hormone-related conditions.	
6	**Analyze current research and advances in endocrine physiology and hormone-based therapies.**	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Endocrine system. The overview.	
2		Classification and functions of endocrine system	
3		Mechanism of action of hormones. Effector systems	
4		Hypothalamus-pituitary system	
5		Posterior pituitary hormones	
6		Hormones of parathyroid gland. Thymus	
7		Hormones of thyroid gland.	
8		Hormones of pancreas gland. Insulin	
9		Hormones of adrenal medulla. Adrenalin.	
10		Hormones of adrenal cortex.	
11		Sex hormones.	
12		Anterior pituitary hormones.	
13		Pineal gland hormones.	
14		Gastrointestinal tract (GIT) hormones	
15		Importance of hormonal investigation in medicine and agriculture	

Recommended Sources

TEXTBOOK(S)

1. **Jameson, J.L., De Groot, L.J.** – *Endocrinology: Adult and Pediatric* (7th Edition)
2. **Mac E. Hadley & Jon E. Levine** – *Endocrinology* (6th Edition)
3. **S.S. Nussey & S.A. Whitehead** – *Endocrinology: An Integrated Approach*
4. **Freeman, M.E., et al.** – *Hormones* (3rd Edition).
5. **Kronenberg, H.M., Melmed, S., Polonsky, K.S., Larsen, P.R.** – *Williams Textbook of Endocrinology* (14th Edition)

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Neurobiology**
Course Unit Code	**ATMF-BO5**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Natavan Karamova

Name of Lecturer (s)	Natavan Karamova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

In the subject "Neurobiology", students will be provided with information about the structure of the nervous system, neurons, anatomy and physiology of the nervous system, biochemical changes, the higher nervous system, and the foundations of human activity that are important in organizing social work.

Objectives of the Course: The main objectives of the subject is to organize the teaching and mastering of all the important features of the subject "Neurobiology", one of the main medical-biological subjects. Man is the highest of all living beings and a social being. In the organization of a person's normal life activity, his completely normal development and the implementation of systematic regularities between organs are based on existing norms.

Operations of the oil and gas industry across the value chain
Relationships and interactions between industry players
Importance of oil and gas in the economy
Likely future scenarios for the industry

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	The goals and objectives of the subject of neurobiology, scientific research methods, mastering the history of development	
2	The structure of the neuron: Plasma membrane, ribosome, endoplasmic reticulum, secretion, Golgi apparatus, lysosome, mitochondria, neuroglia, etc. cellular elements	
3	About nerve fibers: Myelinated and unmyelinated nerve fibers. Nerve endings. Sensory nerve endings. Effector nerve endings	
4	Long-distance communication between synapses and neurons	
5	Development and regeneration of nervous tissue and elements	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	

7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		What is neurobiology? The subject of neurobiology. The goals and objectives of neurobiology, the tasks set. Information about the history of the development of neurobiology and important experiments that played a role in the development of neurobiology.	
2		What is a neuron? The structure of a neuron. Plasma membrane, ribosome, endoplasmic reticulum, secretion, Holci apparatus, lysosome, mitochondria, neuroglia, etc. cellular elements.	
3		About nerve fibers. Myelinated and unmyelinated nerve fibers. Nerve endings. Sensory nerve endings. Effector nerve endings. Distant connection between synapses and neurons. Reflex arc. Development and regeneration of nervous tissue and elements.	
4		Membrane potential. Ionic composition of nerve cells. Donnan equilibrium. Nerve potential. Arousal. Hodgkin-Huxley model. Molecular mechanism of arousal. Action potential, electric field, ionic current.	
5		Mediator and modulator. Molecular nature of synaptic transmission. Stages of synaptic transmission. Dale's rule. Differences between mediators and neuropeptides. Transport of substances.	
6		Developmental process. Neuron formation and migration. Cell differentiation. Cell formation process. Cell death. Regeneration and plasticity.	
7		Sensory systems. Receptors. Sensory network. Sensory perception. Chemical sensation. Internal hemoreceptors. Spinal nerves. Somatosensory cortex. Nervous supply of muscles.	
8		Motor system and functions. Effector organs. Functions of the autonomic nervous system.	
9		Reflex and reflex arc. Characteristics of nerve centers.	
10		The phenomenon of slowing down. Structure and functions of locomotion.	
11		General characteristics of the central nervous system. Neuroendocrine network. Central nervous system. Basal ganglia. Biorhythms. Electroencephalography. Periods of sleep and	

		wakefulness.	
12		Types and diagnostic methods of the higher nervous system. Theories about temperament	
13		Emotion, types and mechanism of formation. About stress. Motivation and its classification. Theories of motivation. Intellect.	
14		Memory, types and characteristics. Fundamentals of attention, perception and cognition.	
15		Behavior and general principles of its organization. Architectonics of human mental activity. Self-regulation of mental activity.	

Recommended
Sources
TEXTBOOK(S)

1. **Dale Purves et al.** – *Neuroscience* (6th Edition)
2. **Eric R. Kandel, James H. Schwartz, Thomas M. Jessell** – *Principles of Neural Science* (5th Edition)
3. **Mark F. Bear, Barry W. Connors, Michael A. Paradiso** – *Neuroscience: Exploring the Brain*
4. **G. M. Shepherd** – *Neurobiology* (3rd Edition)
5. **David Clark, Nashaat Boutros, Mario F. Mendez** – *The Brain and Behavior: An Introduction to Behavioral Neuroanatomy*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

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

Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Higher nervous physiology**
Course Unit Code	**ATMF-BO5**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Natavan Karamova
Name of Lecturer (s)	Natavan Karamova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: In the subject "Higher Nervous Physiology", students will be provided with information about human higher nervous activity, temperaments and their types, the formation of conditioned reflexes, analyzers and their role in human life, etc.	
Objectives of the Course: The main goal of the subject is to teach neuropsychic processes, forms of goal-directed behavior of the organism, functions of sensory systems, regularities of their	

formation, forms and principles of manifestation, conditions of their implementation, the nature of nervous and psychic processes, the essence of brain activity. The main goal is to teach higher nervous activity in all its subtleties and to organize the teaching and assimilation of all its important features by students.			
Operations of the oil and gas industry across the value chain Relationships and interactions between industry players Importance of oil and gas in the economy Likely future scenarios for the industry			
Learning Outcomes: Higher nervous activity, characteristics of human higher nervous activity, first and second signal systems, signs and characteristics of conditioned reflexes;			
At the end of the course the student will be able to			Assessment
1	Teaching of types and diagnostic methods of the higher nervous system, theories of temperament;		
2	Teaching of behavior and general principles of its organization;		
3	Motivation and its classification, theories of motivation. Teaching of information about intelligence;		
4	Teaching and discussion of memory, types and characteristics, attention, the basics of perception and understanding, emotions and their physiological characteristics;		
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz			
Course's Contribution to Program			
			CL
1	Oral and written communication skills in Azerbaijani in the specialty;		
2	Communication skills in at least one foreign language in the specialty;		
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;		
4	The ability to identify threats and challenges faced by our national state;		
5	The ability to use information technologies in the workplace;		
6	The ability to collect and store information, create a database;		
7	The ability to work in a team, achieve a common approach to problem solving;		
8	The ability to adapt to new conditions, take initiative and the will to succeed;		
9	The ability to identify and select additional information resources for solving problems;		
10	The ability to analyze, summarize and apply relevant information for professional purposes;		
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
Course Contents			
Week	Chapter	Topics	Exam
1		Higher nervous activity. Features of the higher nervous activity of a person. The first and second signal systems. Signs and characteristics of conditioned reflexes	

2		Types and diagnostic methods of the higher nervous system. Theories of temperament.	
3		Behavior and general principles of its organization.	
4		Motivation and its classification. Theories of motivation. Intelligence.	
5		Fundamentals of attention, perception and understanding.	
6		Memory, types and characteristics.	
7		Emotions and their physiological bases.	
8		Pain reception and neurochemical mechanisms	
9		Biological bases of sleep and neurophysiological mechanisms.	
10		Architectonics of human mental activity. Self-regulation of mental activity.	
11		Diagnostics of human labor activity and health.	
12		Stress and its psychophysiological bases.	
13		Intelligence and its main criteria.	
14		The main pathologies encountered in higher nervous activity. Pathopsychological study of cognitive processes (perception disorders, agnosia, dementia, sensory delusions, memory disorders, behavioral disorders, etc.).	
15		Psychological development characteristics of mentally retarded children, cognitive processes and research methods, causes of underdevelopment of higher nervous activity.	

Recommended
Sources
TEXTBOOK(S)

1. **Sechenov, I. M.** – *Reflexes of the Brain*
2. **Pavlov, I. P.** – *Conditioned Reflexes*
3. **Luria, A. R.** – *The Working Brain: An Introduction to Neuropsychology*
4. **Kandel, E. R., Schwartz, J. H., Jessell, T. M., Siegelbaum, S. A., & Hudspeth, A. J.** – *Principles of Neural Science* (latest edition)
5. **Bear, M. F., Connors, B. W., & Paradiso, M. A.** – *Neuroscience: Exploring the Brain* (latest edition)

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Pathological physiology**
Course Unit Code	**ATMF-BO5**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Reyhan Abdullayeva
Name of Lecturer (s)	Reyhan Abdullayeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
This course explores the functional changes in cells, tissues, organs, and systems that underlie human diseases. It provides a comprehensive understanding of the mechanisms of disease development (pathogenesis) and the physiological disturbances that result from pathological conditions. Students will study the etiology, progression, and systemic effects of common pathological states such as inflammation, fever, hypoxia, shock, metabolic disorders, and organ dysfunction. Special emphasis is placed on the body's adaptive and compensatory responses to injury and disease. The course bridges the gap between normal physiology and clinical medicine, offering critical insights into how altered physiological processes contribute to symptoms and clinical findings. Through lectures, case studies, and applied discussions, students will develop the ability to analyze and interpret disease mechanisms and apply this knowledge in clinical and diagnostic contexts.

Objectives of the Course: The Pathological Physiology course aims to provide students with a foundational understanding of the mechanisms underlying disease development and progression. It focuses on the physiological basis of pathological processes, including disruptions in homeostasis, cellular injury, inflammation, and systemic dysfunction. Students will explore the etiology and pathogenesis of common disorders affecting various organ systems, while gaining insight into the body's compensatory and adaptive responses to pathological changes. The course is designed to bridge the gap between normal physiology and disease states, promoting clinical reasoning grounded in pathophysiological principles. Through case-based learning and analysis, students will enhance their ability to interpret clinical signs, symptoms, and laboratory findings in the context of disease mechanisms. Ultimately, the course prepares students for future clinical training, where a solid understanding of pathological physiology is essential for accurate diagnosis and effective treatment planning.

97. Operations of the oil and gas industry across the value chain
98. Relationships and interactions between industry players
99. Importance of oil and gas in the economy
100. Likely future scenarios for the industry

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	Explain the mechanisms of disease development and progression, including cellular injury, inflammation, and organ dysfunction.	
2	Describe the physiological alterations associated with common pathological conditions across major body systems.	
3	Interpret clinical signs, symptoms, and laboratory findings based on underlying pathophysiological processes.	
4	Analyze the body’s adaptive and compensatory responses to various disease states and stressors.	
5	Apply pathophysiological knowledge to clinical case analysis and problem-solving in diagnostic and therapeutic contexts.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course’s Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	

2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Subject, tasks, main directions, connection with other sciences of pathophysiology. General pathophysiology.	
2		General etiology, pathogenesis. Concept of disease	
3		The influence of external environmental factors on the development of the disease.	
4		Cellular pathology. Necrosis and apoptosis	
5		The role of heredity and constitution in pathology	
6		The reactivity of the organism and its role in pathology	
7		Typical pathological processes. Pathological physiology of peripheral blood circulation.	
8		Pathological physiology of heat regulation in the organism.	
9		Pathological physiology of tissue growth.	
10		Hunger and general adaptation syndrome	
11		Pathological physiology of the blood and circulatory, respiratory systems	
12		Pathological physiology of the digestive system.	
13		Pathological physiology of the kidneys	
14		Pathological physiology of the endocrine system	
15		Pathological physiology of the nervous system	

Recommended Sources

TEXTBOOK(S)

1. **Ganong, W. F. (2010). *Review of Medical Physiology*. 23rd Edition. McGraw-Hill.**
2. **Boron, W. F., & Boulpaep, E. L. (2016). *Medical Physiology*. 3rd Edition. Elsevier.**
3. **Scheid, R. (2015). *Pathophysiology*. 6th Edition. Elsevier.**
4. **Robbins, S. L., & Cotran, R. S. (2015). *Robbins Basic Pathology*. 9th Edition. Elsevier. — While focused on pathology, it integrates pathological physiology thoroughly.**
5. **Junqueira, L. C., Carneiro, J., & Kelley, R. O. (2016). *Basic Histology: Text & Atlas*. 13th Edition. McGraw-Hill.**

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Applied Genetics**
Course Unit Code	**ATMF-BO6**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Sevinj Nuriyeva
Name of Lecturer (s)	Sevinj Nuriyeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:
It is a branch of biology that studies the genes, heredity, and gene variation of organisms. Genetics occupies one of the central places in the complex of biological disciplines. Modern genetics studies the phenomena of heredity and variation based on the achievements of biological sciences such as biochemistry, biophysics, cytology, embryology, microbiology, zoology, botany, selection, plant breeding, and animal husbandry.

Objectives of the Course: It is a branch of biology that studies the genes, heredity, and gene variation of organisms. Genetics occupies one of the central places in the complex of biological disciplines. Modern genetics studies the phenomena of heredity and variation based on the achievements of biological sciences such as biochemistry, biophysics, cytology, embryology, microbiology, zoology, botany, selection, plant breeding, and animal husbandry.

101. Operations of the oil and gas industry across the value chain
102. Relationships and interactions between industry players
103. Importance of oil and gas in the economy
104. Likely future scenarios for the industry

Learning Outcomes

-**Understand Core Principles**: Demonstrate comprehensive knowledge of the fundamental principles and mechanisms of applied genetics, including gene manipulation, selection, and genetic improvement techniques.

-**Application in Biotechnology and Medicine**: Explain and evaluate the practical applications of genetics in fields such as agriculture, medicine, pharmaceuticals, and biotechnology.

-**Genetic Engineering Techniques**: Gain practical knowledge of genetic engineering tools (e.g., CRISPR-Cas9, cloning, PCR) and their uses in modifying and improving organisms.

At the end of the course the student will be able to		Assessment
1	Formation of an understanding of genetics;	
2	Formation of students' ideas about the goals and objectives of their training;	
3	Formation of knowledge about research conducted in the field of modern genetics;	
4	Understanding of mutations and their forms;	
5	Discuss and critically analyze the ethical, legal, and social implications of genetic technologies in real-world applications.	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		History of the formation and development of molecular biology.	
2		Nucleic acids (DNA and RNA). The role of nucleic acids in transmission. Erwin Chartgaff's rule.	
3		Nucleic acids - biopolymers, constituent components.	
4		Application of genetic engineering in microbiology.	
5		Use of polyploids, aneuploids, induced mutants	
6		Genetic maps of chromosomes. Linear arrangement of genes on a chromosome.	
7		Non-chromosomal inheritance. Properties of mitochondria.	
8		Adaptive modification. Reaction rate. Classification of mutations by genotype.	
9		Natural mutagenesis and its causes. Artificial mutagenesis. Genetic load of populations.	

10		Chemical and enzymatic composition of genes. Vector - gene transfer and chromosomes.	
11		Application of genetic engineering in microbiology.	
12		Use of polyploids, aneuploids, induced mutants	
13		Concept of society. Genetic unity of races.	
14		Genetics in the service of gerontology.	
15		Current directions and aspects of genetic research and applied genetics	

TEXTBOOK(S)

1. **"Principles of Genetics"** by D. Peter Snustad & Michael J. Simmons
2. **"Genetics: Analysis and Principles"** by Robert J. Brooker
3. **"Applied Genetics in Healthcare"** by Roger Watson & Ian Norman
4. **"Gene Cloning and DNA Analysis: An Introduction"** by T.A. Brown

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**

ECTS Credit of the Course	**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Ecological genetics**
Course Unit Code	**ATMF-BO6**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Sevinj Nuriyeva
Name of Lecturer (s)	Sevinj Nuriyeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:
It is a branch of biology that studies the genes, heredity and gene variation of organisms. Genetics occupies one of the central places in the complex of biological disciplines. Modern genetics studies the phenomena of heredity and variation based on the achievements of biological sciences such as biochemistry, biophysics, cytology, embryology, microbiology, zoology, botany, breeding, plant breeding and animal husbandry. Genetic studies have greatly enriched the theoretical field of biology, as well as zootechnics, veterinary medicine, agricultural animal breeding, plant breeding and seed breeding, and medicine.

Objectives of the Course: The goal of the subject of "genetics", which is considered the key to biological sciences, is to train highly qualified biologists who meet modern requirements, have deep theoretical and practical training, and are able to achieve success in the field of biotechnology.

105. Operations of the oil and gas industry across the value chain
106. Relationships and interactions between industry players
107. Importance of oil and gas in the economy
108. Likely future scenarios for the industry

Learning Outcomes

-Explain the principles of ecological genetics, including how genetic variation is influenced by environmental factors.

-Describe genetic adaptation and the role of natural selection in shaping populations in

different ecosystems.
-**Analyze population structure** and gene flow within and between natural populations using ecological and genetic data.

At the end of the course the student will be able to		Assessment
1	Formation of an understanding of genetics	
2	Formation of students' ideas about the goals and objectives of their training	
3	Formation of knowledge about research conducted in the field of modern genetics	
4	Formation of knowledge about the structure of DNA and RNA, which are the material basis of heredity, genes and the mechanism of their functioning	
5		

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Ecological genetics as a free discipline	
2		Ecological-genetic aspects of ecological genetics	
3		Adaptation and its main types	
4		Genetic nature of adaptations: integrativity and heterogeneity	
5		Mechanisms of genetic regulation of adaptive reactions in prokaryotes and eukaryotes	
6		Ecological-phylogenetic adaptogenesis of genetic systems	
7		Ontogenetic adaptations and their characteristics	
8		Biological variability and heredity of traits	

9		Mutations as a source of genotypic variability. Molecular basis of mutagenesis	
10		The role of mutations in adaptation and evolution	
11		Recombinations as a source of genotypic variability, their role in adaptation and evolution	
12		Mechanisms of protection of the genome from mutagens, the role of reparative systems.	
13		Fundamentals of human ecogenetics	
14		Ecogenetic aspects of biotechnology	
15		Conservation of genetic diversity as an important problem of ecogenetics	

Recommended
Sources
TEXTBOOK(S)

1. **Ecological Genetics"** *– E.B. Ford*
2. **"Evolutionary Ecology"** *– Eric R. Pianka*
3. **"Principles of Population Genetics"** *– Daniel L. Hartl & Andrew G. Clark*
4. **"Molecular Ecology"** *– João Pedro Maia & Joanna R. Freeland*

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			

Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Medical biology**
Course Unit Code	**ATMF-BO6**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Sevinj Nuriyeva
Name of Lecturer (s)	Sevinj Nuriyeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-
Course description: The subject "Medical Biology" is also a theoretical subject. In the teaching of the subject "Medical Biology", important topics such as the biology of the human cell and its main morpho-functional characteristics, genes, mutations, the most common hereditary diseases, genetics of sex, biological aging, longevity, parasitology, transmissible diseases, anthropology, the origin of races, modern problems of human ecology, adaptation mechanisms, regeneration, emotional stress, cognitive processes, etc. will be discussed.	
Objectives of the Course: The course "Medical Biology" reflects a theoretical and	

methodological approach for a broad and comprehensive study of normal and pathological processes occurring in the human body, which is the object of scientific research. The main goal of the course is to study the highest being, the human being, at the level of the organism and to analyze the indicators that are important for health. By studying this course, students will understand the human body as a single system. Thus, this specialty course aims to provide students with deeper knowledge about the functional organization of the body, enabling them to understand medicine, genetics, applied biology and diagnostics, as well as other related fields of science, in the future, and to raise their intellectual level.

109. Operations of the oil and gas industry across the value chain
110. Relationships and interactions between industry players
111. Importance of oil and gas in the economy
112. Likely future scenarios for the industry

Learning Outcomes

-Demonstrate knowledge of basic biological principles relevant to medicine, including cell structure, function, and biomolecular organization.
-Explain the role of DNA, genes, and chromosomes in heredity, genetic disorders, and molecular medicine.
-Describe key cellular processes such as mitosis, meiosis, protein synthesis, and cell signaling with relevance to human health.
-Understand the structure, classification, and pathogenicity of microbes, and the basics of the immune response to infectious agents.

At the end of the course the student will be able to		Assessment
1	Cell biology: types and basic morpho-functional characteristics;	
2	Human genes and their properties;	
3	Gene mutations and modern classification;	
4	Hereditary diseases common in humans;	
5	Features of sex genetics;	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents			
Week	Chapter	Topics	Exam
1		Cell biology: types and main morpho-functional characteristics	
2		Human genes and their characteristics	
3		Genes mutations and modern classification	
4		Hereditary diseases in humans	
5		Features of sex genetics	
6		Morphological and genetic characteristics of biological aging	
7		Factors affecting longevity	
8		Parasitology. Classification of parasitism and main character traits	
9		Biological characteristics of transmissible and naturally occurring diseases	
10		Anthropology and characteristics of races	
11		Human ecology and the impact of modern problems on the human body.	
12		The concept of human ecogenetics.	
13		Mechanisms of genetic regulation of adaptive reactions	
14		Regeneration, transplantation and explantation	
15		Features of physiological regularities arising in the human body during emotional tension and stress	

Recommended
Sources
TEXTBOOK(S)

1. **"Medical Biology"** by S. I. Kochubei and V. I. Kalashnikov
2. **"Human Biology and Health"** by Michael D. Johnson
3. **"Medical Cell Biology"** by Steven R. Goodman
4. **"Essential Medical Genetics"** by Michael Connor and Malcolm Ferguson-Smith
5. **"Principles of Medical Biology"** edited by E.E. Bittar and Neville Bittar (multi-volume series)

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**MICROBIOLOGY OF FOOD PRODUCTS**
Course Unit Code	**ATMF-BO7**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	PhD.Lala Gurbanova
Name of Lecturer (s)	PhD.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The country's microbiology industry is faced with requirements such as accelerating the development of production based on microbiological synthesis and ensuring a significant increase in production productivity. Not only scientists - microbiologists, chemists and technologists, but also university graduates specializing in microbiology should actively participate in solving this great need. Arming future specialists with knowledge in the field of industrial microbiology is a key component of training. Currently, industrial microbiology constitutes the main part of biotechnology and is increasingly gaining importance in the national economy. It is important for university students specializing in microbiology and other fields to become familiar with industrial processes based on the application of microorganisms, as well as the prospects of these processes. In industrial technologies, the environmental safety, quality and compositional indicators of raw materials, the efficiency of production processes, the compliance of manufactured food products with established norms - that is, the requirements of the relevant standard, and the fulfillment of sanitary and hygienic requirements are of great importance.

Objectives of the Course: In the subject of food microbiology, students will be given information about the structure of microorganisms, their position in the living world, special and general microbiology, and the ecology of microorganisms.

The main objective of the subject is to organize the teaching and mastering of all the important features of the subject of "Food Microbiology", one of the main medical and biological subjects. Man is the highest of all living beings and is a social being. In the organization of normal human life, his completely normal development and the implementation of systematic regularities between organs in accordance with existing norms are essential. In particular, the subject is of great importance for consumer products to be fully valuable and not to harm health.

During the study of the subject:
-Information about the science of food microbiology, departments of microbiology, subject, purpose and objectives, teaching the role of microorganisms in the living world, history of development and modern classification of microbiology;
-Principles of cultivation of microorganisms;

113. Operations of the oil and gas industry across the value chain
114. Relationships and interactions between industry players
115. Importance of oil and gas in the economy
116. Likely future scenarios for the industry

Learning Outcomes

1. **Understand the fundamental concepts of food microbiology**, including the types of microorganisms involved in food production and spoilage.
2. **Identify the main microbial groups associated with different food products**, such as bacteria, yeasts, molds, and viruses.
3. **Explain the role of microorganisms in food fermentation processes** and how they contribute to the development of food flavors, textures, and preservation.
4. **Analyze the causes and mechanisms of food spoilage** and the microbial contamination routes in various food products.

At the end of the course the student will be able to		Assessment
1	Morphology and ultrastructure of prokaryotic and eukaryotic microorganisms;	
2	The role of enzymes of microorganisms in metabolism. Physiology of microorganisms;	
3	Chemical composition of microorganisms, metabolism, respiration, pigments, aromatic substances, growth and reproduction, nutrition types and nutrition mechanisms;	
4	Mycoflora of water, air, food products. The role of microorganisms in the environment;	
5	Use ICT and electronic resources on sections and topics, prepare various electronic teaching materials, presentations	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	

9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		History and tasks of food microbiology	
2		Morphology, systematics and physiology of microorganisms	
3		Genetics of microorganisms, the influence of environmental factors on microorganisms, important biochemical processes and complications caused by microorganisms	
4		Pathogenic microorganisms, foodborne diseases and their microbiological basis	
5		Distribution of microorganisms in nature	
6		Microbiology of grain and flour products	
7		Microbiology of confectionery products	
8		Microbiology of starch and sugar products	
9		Microbiology of eggs and egg products	
10		Microbiology of whole goods: tea, coffee, table salt, alcoholic and non-alcoholic beverages	
11		Microbiology of fruits and vegetables	
12		Microbiology of milk and dairy products	
13		Microbiology of vegetable and animal fats	
14		Microbiology of meat products	
15		Microbiology of fish products	

Recommended Sources

TEXTBOOK(S)

1. **Jay, J. M., Loessner, M. J., & Golden, D. A.** (2005). *Modern Food Microbiology* (7th ed.). Springer.
2. **Ray, B., & Bhunia, A.** (2013). *Fundamental Food Microbiology* (5th ed.). CRC Press.
3. **Adams, M. R., & Moss, M. O.** (2008). *Food Microbiology* (3rd ed.). Royal Society of Chemistry.
4. **Montville, T. J., Matthews, K. R., & Kniel, K. E.** (2012). *Food Microbiology: An Introduction* (3rd ed.). ASM Press.
5. **Forsythe, S. J.** (2010). *The Microbiology of Safe Food* (2nd ed.). Wiley-Blackwell.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	

Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Industrial microbiology**
Course Unit Code	**ATMF-BO7**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Phd.Lala Gurbanova

Name of Lecturer (s)	PhD.Lala Gurbanova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description. The microbiology industry is faced with requirements such as accelerating the development of production based on microbiological synthesis and ensuring a significant increase in production productivity. Currently, industrial microbiology constitutes the main part of biotechnology and is increasingly gaining importance in the national economy. It is important for university students specializing in microbiology and other fields to become familiar with industrial processes based on the application of microorganisms, as well as the prospects of these processes

Objectives of the Course: In the subject of industrial microbiology, students will be given information about the structure of microorganisms, their position in the living world, special and general microbiology, virology, and the ecology of microorganisms.

The main objective of the subject is to organize the teaching and mastering of all the important features of the subject of "Industrial Microbiology", one of the main medical and biological subjects. Man is the highest of all living beings and is a social being. In the organization of normal human life, his completely normal development and the implementation of systematic regularities between organs in accordance with existing norms are essential. In particular, the subject is of great importance for consumer products to be fully valuable and not to harm health.

During the study of thesubject.

Learning Outcomes

- Information about the science of industrial microbiology, departments of microbiology, subject, purpose and objectives, teaching the role of microorganisms in the living world, history of development and modern classification of microbiology;
- Principles of cultivation of microorganisms.

At the end of the course the student will be able to		Assessment
1	- Morphology and ultrastructure of prokaryotic and eukaryotic microorganisms;	
2	- The role of enzymes of microorganisms in metabolism. Physiology of microorganisms;	
3	- Chemical composition of microorganisms, metabolism, respiration, pigments, aromatic substances, growth and reproduction, types of nutrition and mechanisms of nutrition;	
4	- Mycoflora of water, air, food products. The role of microorganisms in the environment;	
5	- Use ICT and electronic resources on sections and topics, prepare various electronic teaching materials, presentations	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	

3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Scientific foundations of industrial microbiology	
2		General properties of microorganisms	
3		Selection of microorganisms - producers of practically important substances	
4		Obtaining practically useful strains of microorganisms using genetic engineering	
5		Bacterophages in microbiology industry	
6		Obtaining biologically active substances and individual components of microbial cells: Antibiotics and vitamins	
7		Obtaining biologically active substances and individual components of microbial cells: Carotenoids, hibernins and alkaloids	
8		Obtaining biologically active substances and individual components of microbial cells: Amino acids, nucleotides and enzymes	
9		Obtaining biologically active substances and individual components of microbial cells: Lipids and polysaccharides	
10		Use of fermentation and other metabolic processes. Alcohol fermentation	
11		Obtaining vinegar and other aspects of using acetic acid bacteria	
12		Production of organic acids	
13		Production based on the production of microbial biomass	
14		Production of vaccines, bacteriophages and drugs that normalize human microflora	
15		Productions based on the production of microbial biomass	

Recommended

Sources
TEXTBOOK(S)

1. **"Industrial Microbiology"** by Michael J. Waites, Neil L. Morgan, John S. Rockey, and Gary Higton
2. **"Principles of Fermentation Technology"** by Peter F. Stanbury, Allan Whitaker, and Stephen J. Hall
3. **"Industrial Microbiology: An Introduction"** by Michael J. Waites, Neil L. Morgan
4. **"Manual of Industrial Microbiology and Biotechnology"** edited by Richard H. Baltz, Julian E. Davies, Arnold L. Demain
5. **"Microbial Biotechnology: Fundamentals of Applied Microbiology"** by Alexander N. Glazer and Hiroshi Nikaido

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Food safety**
Course Unit Code	**ATMF-BO7**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Nigar Huseynova
Name of Lecturer (s)	Nigar Huseynova
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
In the technologies for the preparation of various types of food products that are safe, environmentally friendly and free from harmful components for the human body, the quality and composition of raw materials, the efficiency of production processes, environmental safety, compliance of manufactured products with established norms - that is, the requirements of the relevant Standard, and the fulfillment of sanitary and hygienic requirements are of great importance. The solution of all the listed issues requires knowledge of the methods of research of food raw materials and finished food products. This field of science involves the creation of new principles and methods of food systems, as well as the determination of the structure of individual substances included in the composition of food products, their functions and interactions with other components.

Objectives of the Course: Learning how to ensure the provision of food products with high quality indicators;
- ensuring the production of a variety of food products that are safe, clean and free of harmful components for the human body;
- learning the basics of purchasing environmentally safe plant and animal products;
- food safety. physical and economic availability of food for consumers;
- familiarization with the main regulatory and legal documents on modern management systems in the field of food safety

117. Operations of the oil and gas industry across the value chain
118. Relationships and interactions between industry players
119. Importance of oil and gas in the economy

120. Likely future scenarios for the industry

Learning Outcomes

- **Understand core concepts** of food safety, including biological, chemical, and physical hazards in the food supply chain.
-**Identify and apply food safety standards** such as HACCP (Hazard Analysis and Critical Control Points), GMP (Good Manufacturing Practices), and ISO food safety standards.
-**Recognize foodborne pathogens** and describe methods for their detection, control, and prevention.
-**Analyze risk factors** that lead to food contamination and apply preventative strategies.

At the end of the course the student will be able to		Assessment
1	Identify biological, chemical, and physical hazards that can compromise food safety throughout the supply chain.	
2	Explain the principles and practices of food hygiene and sanitation in food production, processing, and handling.	
3	Understand national and international food safety standards and regulations, including HACCP and Codex Alimentarius.	
4	Evaluate risk factors and implement preventive measures to control contamination and ensure food quality and safety.	
5	Apply food safety knowledge in real-world scenarios, including inspection, audit preparation, and safety management systems.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Topic No. 1. Introduction. Fundamentals of Producing Ecologically Safe Food Product	
2		Topic No. 2. Ecologically Safe Crop Production	
3		Topic No. 3. Ecologically Safe Animal Husbandry	
4		Topic No. 4. Biological Value of Food Product	
5		Topic No. 5. Epidemiological Safety of Food Products	
6		Topic No. 6. Toxicological Safety of Food Products	
7		Topic No. 7. Nutritional, Biological Value, and Safety of Grains, Flour, Semolina, and Bakery Products	
8		Topic No. 8. Nutritional, Biological Value, and Safety of Fruit and Vegetable Products	
9		Topic No. 9. Nutritional, Biological Value, and Safety of Meat and Meat Products	
10		Topic No. 10. Nutritional Value of Food Products	
11		Topic No. 11. Nutritional, Biological Value, and Safety of Milk and Dairy Products	
12		Topic No. 12. Nutritional, Biological Value, and Safety of Fish and Fish Products	
13		Topic No. 13. Genetically Modified Food Products	
14		Topic No. 14. Food Additives and Their Safety	
15		Topic No. 15. Biologically Active Additives and Their Safety	

Recommended Sources

TEXTBOOK(S)

1. **"Food Safety: Theory and Practice**- Paul L. Knechtges
2. **"Food Safety Management: A Practical Guide for the Food Industry"**-Yasmine Motarjemi and Huub Lelieveld
3. **"Modern Food Microbiology"**-James M. Jay, Martin J. Loessner, David A. Golden
4. **"Food Safety Culture: Creating a Behavior-Based Food Safety Management System"** Author: Frank Yiannas

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU			
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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Marine flora**
Course Unit Code	**ATMF – B08**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Sevincj Racabova
Name of Lecturer (s)	Sevincj Racabova

Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The program of the subject "Marine Flora" provides information about the current state of marine flora under the influence of modern ecological factors.
Attention is paid to the distribution of marine plants in the world, ecology, innovations in systematics, and especially to the biodiversity and ecology of plants in the Caspian Sea.

Objectives of the Course: To create an understanding among students about the classification, ecology, and practical importance of marine plants.

121. Operations of the oil and gas industry across the value chain
122. Relationships and interactions between industry players
123. Importance of oil and gas in the economy
124. Likely future scenarios for the industry

Learning Outcomes

-Identify and classify major groups of marine flora, including algae (microalgae and macroalgae), seagrasses, and other aquatic plants/
-Explain the reproductive strategies and life cycles of various marine plant species.
-Evaluate the threats and conservation challenges facing marine flora, including pollution, -climate change, and invasive species.
-Apply basic field and laboratory techniques for sampling, identifying, and studying marine plants.

At the end of the course the student will be able to		Assessment
1	Formation of ideas about the goals and objectives of the subject "Marine Flora", scientific research methods, and its relationship with other sciences;	
2	Formation of ideas about the systematics and ecology of algae, macrophytes, fungi, and higher plants in modern seas and oceans;	
3	Formation of ideas about the means of its teaching;	
4	**Understand the ecological roles and significance of marine flora** in marine ecosystems, such as their contribution to primary production and habitat formation.	
5	**Analyze the impact of abiotic factors** (light, temperature, salinity, nutrients) on the growth and distribution of marine plants.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani in the specialty;	
2	Communication skills in at least one foreign language in the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its	

	place and role in the modern world; the ability to predict the prospective development of our national state;	
4	The ability to identify threats and challenges faced by our national state;	
5	The ability to use information technologies in the workplace;	
6	The ability to collect and store information, create a database;	
7	The ability to work in a team, achieve a common approach to problem solving;	
8	The ability to adapt to new conditions, take initiative and the will to succeed;	
9	The ability to identify and select additional information resources for solving problems;	
10	The ability to analyze, summarize and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		The general summary about the marine flora	
2		The biodiversity of the algae. Ecological groups	
3		Systematic groups, Blue-green algae, Red algae, Brown algae, Green algae	
4		The algae in the Caspian Sea ecosystem	
5		The macrophytes of the Caspian Sea.	
6		The land plants in the marine ecosystem	
7		The research methods of the algae	
8		Diatom algae	
9		Gaptophytoes	
10		Dinophytes	
11		The life cycle of the algae	
12		The algae and the environmental factors	
13		Biodiversity and the seasonal dynamics of the phytoplankton	
14		The practical importance of the algae	
15		The artificial cultivation of the algae	

Recommended Sources

TEXTBOOK(S)

1. **"Marine Botany"** by D.J. Chapman
2. **"Introduction to Marine Biology"** by George Karleskint, Richard Turner, and James Small

3. **"Seaweed Ecology and Physiology"** edited by C.S. Lobban and M.J. Wynne
4. **"Ecology of Marine Plants"** by Michael D. Fortes and others
5. **"Algae: An Introduction to Phycology"** by C. Van Den Hoek, D.G. Mann, and H.M. Jahns

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Ichthyology**
Course Unit Code	**ATMF-BO8**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Lamia Yaralıyeva
Name of Lecturer (s)	Lamia Yaralıyeva
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:
The purpose of the course "Ichthyology" is to familiarize students with the fish species widely distributed in the inland water bodies and territorial waters of our republic, as well as around the world, and to teach them about their biology. For this purpose, students are introduced to the taxonomy of fish, their characteristic features, the effects of abiotic and biotic factors on them and their adaptations to these factors, as well as the reduction in the diversity and quantity of fish species due to various reasons and the threat of their extinction.

Objectives of the Course:" The purpose of the course "Ichthyology" is to provide students with information about the structural characteristics of fish depending on their living conditions, their ecological groups, distribution, intraspecific and interspecific interactions, systematics, skeleton, internal organs, their anatomy and physiology, reproduction, productivity, developmental stages, feeding, and growth rate. It also aims to explain the existing resources in various water bodies and their significance.

125. Operations of the oil and gas industry across the value chain
126. Relationships and interactions between industry players
127. Importance of oil and gas in the economy
128. Likely future scenarios for the industry

Learning Outcomes

Explain the subject, goals, and main tasks of oceanology as a scientific discipline.
Describe the development stages and historical progress of oceanology.
Identify and analyze the morphometric characteristics of the World Ocean.
Understand the formation, distribution, and balance of seawater masses in the World Ocean.
Describe the physical properties of seawater including temperature, salinity, pressure, and their

spatial and temporal variations.		
At the end of the course the student will be able to		Assessment
1	-the classification and biology of fish;	
2	-the basic regularities of processes occurring in aquatic ecosystems;	
3	-the systematics, biology, distribution, and current state of fishing of economically important fish species;	
4	-the effects of abiotic and biotic factors on fish and their adaptations;	
5	-the basic regularities of the geographical distribution of fish.	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		

Course's Contribution to Program

		CL
1	Communication skills in at least one foreign language relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction. History of Ichthyology. General Ichthyology.	
2		Structure of fish (skin, muscles, skeleton)	

3		Digestive and respiratory systems of fish	
4		Internal organs of fish (circulatory, excretory, reproductive, and nervous systems)	
5		Interactions of fish with abiotic environmental factors	
6		Interactions of fish with biotic environmental factors	
7		Feeding and food competition of fish	
8		Reproduction of fish	
9		Migration of fish	
10		Special ichthyology. Cyclostomes (jawless fish)	
11		Cartilaginous fish	
12		Primitive bony fish	
13		Higher bony fish	
14		Geographical distribution of fish and its regularities	
15		Ichthyofauna of Azerbaijan and main economically important fish species.	

Recommended
Sources
TEXTBOOK(S)

1. **"Fishes: An Introduction to Ichthyology"** by Peter B. Moyle and Joseph J. Cech Jr.
2. **"The Diversity of Fishes: Biology, Evolution, and Ecology"** by Gene S. Helfman, Bruce B. Collette, Douglas E. Facey, and Brian W. Bowen
3. **"Ichthyology"** by Peter H. Greenwood, John S. Nelson, and Leonard S. Craig
4. **"Fish Physiology"** edited by William S. Hoar, David J. Randall, and Anthony P. Farrell
5. **"Ecology of Teleost Fishes"** by Anthony D. Hasler

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Oceanology**
Course Unit Code	**ATMF-B08**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Humbatov Mahmud Farzali
Name of Lecturer (s)	Humbatov Mahmud Farzali
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azeirbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: The subject of General Oceanology is the field of science that studies the regularities of physical, chemical, biological, and other processes occurring in oceans and seas. By mastering this field of science, efficient utilization of the natural resources of oceans and seas is achieved.	
Objectives of the Course: The purpose of the course is to provide detailed information about the oceans, including the physical-chemical and biological processes occurring there, in order to	

enable the utilization of the ocean's natural resources by humans. A brief overview of the course, related (directly connected or relevant) subjects, and the objectives of teaching the course are provided. It also describes what students will learn, what they will achieve, and the skills they will acquire by studying this course.

129. Operations of the oil and gas industry across the value chain
130. Relationships and interactions between industry players
131. Importance of oil and gas in the economy
132. Likely future scenarios for the industry

Learning Outcomes

-Explain the subject, goals, and main tasks of oceanology as a scientific discipline.
-Describe the development stages and historical progress of oceanology.
-Identify and analyze the morphometric characteristics of the World Ocean.
-Understand the formation, distribution, and balance of seawater masses in the World Ocean.

At the end of the course the student will be able to		Assessment
1	Explains the nature of physical processes occurring in oceans and seas;	
2	Analyzes the dynamics and measurements of waves;	
3	Justifies the causes and current status of sea level fluctuations in oceans and seas;	
4	Describes the flow regime, temperature regime, and other characteristics, as well as their spatial and temporal distribution;	
5	Analyzes the impact of changes occurring in seas and oceans on the climate.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-	

	solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Subject, purpose, and tasks of the science of oceanology. Development stages of oceanology	
2		Morphometric characteristics of the World Ocean	
3		Formation of the water mass of the World Ocean and water balance	
4		Physical characteristics of seawater. Distribution of salinity in the World Ocean	
5		Pressure in the ocean. Hydrostatic equation. Equation of state of seawater	
6		Stability of water layers in the ocean	
7		Acoustic and optical properties of the ocean	
8		Heat exchange between the ocean and the atmosphere	
9		Anomalies of the physical properties of water. Sea ice and its classification	
10		Main physical properties of sea ice. Optical radiation and thermal properties of sea ice	
11		Waves in the ocean and their classification	
12		Tsunami waves, internal waves. Tides and seiches	
13		Currents of the World Ocean and general circulation	
14		Sea currents and forces causing the currents. Ekman theory of ocean currents	
15		Tilt of isobaric and isosteric surfaces during currents	

Recommended Sources

TEXTBOOK(S)

1. **"Introduction to Physical Oceanography"** by Robert H. Stewart
2. **"Oceanography: An Invitation to Marine Science"** by Tom S. Garrison
3. **"Essentials of Oceanography"** by Alan P. Trujillo and Harold V. Thurman
4. **"Descriptive Physical Oceanography: An Introduction"** by Lynne D. Talley, George L. Pickard, William J. Emery, and James H. Swift
5. **"Chemical Oceanography"** by Frank J. Millero

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	

Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Photosynthesis**
Course Unit Code	
Type of Course Unit	Selective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2

Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Qurbanova Lale Meherrem qızı
Name of Lecturer (s)	Qurbanova Lale Meherrem qızı
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Photosynthesis, one of the subjects of our education, is a unique process in the biosphere of the Earth, which is a source of organic matter and energy for the vast majority of living organisms. Its study is traditional for plant physiology and biochemistry, but today, in the postgenomic or epigenetic era, this process is also in the focus of attention of scientists. Active molecular biological, biophysical, molecular-genetic studies of bio and artificial systems of various levels of complexity that carry out photosynthesis, as well as studies of photosynthesis on a global scale due to the exceptional role of this process in ecosystems and the biosphere as a whole, are gaining popularity. Modern photosynthesis science is a complex complex of scientific knowledge that studies this process in all its manifestations.

It is impossible to obtain high-quality indicators at the modern level without knowing the methodological foundations. The teaching of the subject is closely related to such disciplines as ecology, physics, chemistry, biochemistry, mathematics. Therefore, throughout the course we will try to study issues that meet the requirements of the modern era.

Objectives of the Course:

The goal of the science of photosynthesis is to master modern ideas about the mechanisms of the photosynthesis process in all its manifestations, up to the molecular biosphere scale.

- to give an idea of the role of photosynthesis in the Earth's biosphere, its importance in ecosystems and for plants, and the scale of photosynthetic activity;- to acquaint students with the theoretical foundations

of the functioning of photosynthetic systems from molecules to the biosphere, the mechanisms of photophysical, photochemical and biochemical processes and their regulation;

- to form ideas about the meaning of the application of knowledge about photosynthesis.

The development of this subject is based on the knowledge and skills acquired during the study of such subjects as general biochemistry, molecular biology, plant physiology, cytology, chemistry, physics, botany;

133. Operations of the oil and gas industry across the value chain
134. Relationships and interactions between industry players
135. Importance of oil and gas in the economy
136. Likely future scenarios for the industry

Learning Outcomes

Understanding the Concept of Photosynthesis:
Learners should be able to explain that photosynthesis is the process by which plants, algae, and some bacteria convert light energy into chemical energy stored in glucose.

Identifying the Reactants and Products:
Learners should identify the main reactants (carbon dioxide, water, and light energy) and products (glucose and oxygen) of the photosynthesis process.

Describing the Role of Chlorophyll:
Learners should understand how chlorophyll and other pigments absorb light, specifically focusing on how chlorophyll absorbs light in the blue and red wavelengths, and reflects green.

Explaining the Stages of Photosynthesis:
Learners should be able to describe the two main stages of photosynthesis: the light-dependent reactions (which occur in the thylakoid membranes of chloroplasts) and the Calvin cycle (light-independent reactions, occurring in the stroma).

At the end of the course the student will be able to		Assessment
1	As a result of mastering the subject, students should know: - Morphology and ultrastructure of prokaryotic and eukaryotic microorganisms;	
2	- The role of enzymes of microorganisms in metabolism. Physiology of microorganisms;	
3	- Chemical composition, metabolism, respiration, pigments, aromatic substances, growth and reproduction, nutrition types and feeding mechanisms of microorganisms;	
4	- Mycoflora of water, air, and food products. The role of microorganisms in the environment;	
5	-use ICT and electronic resources across sections and topics, prepare various electronic teaching materials and presentations.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL

1	Oral and written communication skills in Azerbaijani language in the specialty	
2	Communication skills in at least one foreign language in the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state	
4	Ability to identify threats and challenges facing our nation-state;	
5	Ability to use information technology in the workplace;	
6	Ways of collecting and storing data, ability to create a database	
7	Ability to work in a team and achieve a common approach to problem solving;	
8	Ability to adapt to new circumstances, take initiative, and have the will to succeed	
9	Ability to identify and select additional information resources to solve problems;	
10	Skills to analyze, summarize, and apply relevant information for professional purposes;	
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Exam
1		The subject and main task of the science of photosynthesis	
2		Structural basis of photosynthesis	
3		The structure of the photosynthetic apparatus	
4		Biochemistry of photosynthesis	
5		Pigment systems of the photosynthetic apparatus	

6		Photoreceptor function of pigment systems	
7		Photochemical systems of chloroplasts	
8		Molecular organization of photosynthetic membranes	
9		The light stage of photosynthesis. Photophysical and photochemical reactions of photosynthesis	
10		Dark phase of photosynthesis. Biochemical reactions of photosynthesis	
11		Factors affecting photosynthesis	
12		Ecology of photosynthesis	
13		Photosynthesis and production process	
14		Features of photosynthesis in bacteria and algae. Chemosynthesis	
15		The evolution of photosynthesis	

Recommended Sources TEXTBOOK(S)

"Photosynthesis" by David W. Lawlor

A comprehensive book that covers both the biochemical and physiological aspects of photosynthesis. It is ideal for students and researchers looking for a detailed overview.

"Photosynthesis: Physiology and Metabolism" by Hans Lambers, Henk Poorter, and Michael D. S. O'Brien

This book focuses on how plants adapt to environmental conditions, as well as the underlying metabolic processes involved in photosynthesis.

"Plant Photosynthesis: Methods and Protocols" edited by Allen J. Karpinski and Wojciech K. Dąbrowski

This book offers protocols and methodologies for investigating various aspects of photosynthesis, from molecular techniques to physiological approaches.

"The Photosynthesis Handbook" edited by R. C. S. Raghavendra

A detailed resource for anyone studying photosynthesis, particularly those interested in the biochemical and molecular details.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

In turn, it helps students master such subjects as biophysics, ecology, microbiology.

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Virusology**
Course Unit Code	**ATMF-BO9**
Type of Course Unit	Selective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Mahmud Humbatov
Name of Lecturer (s)	Mahmud Humbatov
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Introduction to modern methods and techniques of Virusology in organizing and conducting various types of classes. Study of the structure, physiology, reproduction, role in human life and ecology of viruses in the educational process. Preparation of students to ensure the scientific and methodological preparation of future biologists. Development of self-education, self-affirmation, etc. characteristics that are necessary for the development of future biologists and form the basis of scientific potential.

Objectives of the Course: The main goal of teaching the subject "Virology" to students studying the specialty "Biology" is to form ideas about the mechanism of the effect of viruses on the host cell and possible methods of reducing the strength of this effect.

Another important goal of teaching this subject is to make students understand the pathogenesis of diseases caused by specific types of viruses.

Learning Outcomes

Understanding of Virus Structure and Classification

Identify and describe the basic structure of viruses (e.g., capsid, envelope, genome type).

Classify viruses according to their morphology, genome composition (DNA or RNA), and replication strategies (e.g., retroviruses, adenoviruses).

Understand the different viral families and their characteristics.

Knowledge of Viral Replication and Life Cycle

Describe the processes of viral entry, uncoating, replication, assembly, and release.

Explain how viruses hijack host cell machinery for replication and how viral genomes are

expressed.
Discuss differences between lytic and lysogenic cycles, and the concept of viral latency.

At the end of the course the student will be able to		Assessment
1	Operations of the oil and gas industry across the value chain	
2	Relationships and interactions between industry players	
3	Importance of oil and gas in the economy	
4	Likely future scenarios for the industry	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani language in the specialty	
2	Communication skills in at least one foreign language in the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state	
4	Ability to identify threats and challenges facing our nation-state;	
5	Ability to use information technology in the workplace;	
6	Ways of collecting and storing data, ability to create a database	
7	Ability to work in a team and achieve a common approach to problem solving;	
8	Ability to adapt to new circumstances, take initiative, and have the will to succeed	
9	Ability to identify and select additional information resources to solve problems;	
10	Skills to analyze, summarize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		**History of the origin and development of virology.** Discovery of viruses Stages of development of virology Nature of viruses Hypotheses about the origin of viruses	
2		**Classification of viruses (classification).** Classification of DNA viruses Brief description of DNA viruses Classification of RNA viruses	

		Brief description of RNA viruses.	
3		**Morphology of virions.** Structure of virions Structure of viroids Structure of prions	
4		**Chemical composition of viruses.** Proteins of viruses Nucleic acids of viruses Viral DNA and RNA Lipids of viruses Carbohydrates of viruses	
5		**Life cycle and reproduction of viruses.** Adsorption of viruses to the cell surface Entry of viruses into the cell Replication of the viral genome Uncoating of viruses Assembly of virus particles	
6		**Virus cultivation and laboratory diagnostics.** Cultivation of viruses in cell or tissue cultures Cultivation of viruses in the body of laboratory animals Cultivation of viruses in chicken embryos Laboratory diagnostics of viruses Agglutination and precipitation reactions.	
7		**Genetics of viruses.** Heredity of viruses Variability and mutation in viruses Genetic relationships between viruses	
8		**Bacteriophages.** Classification and morphology of bacteriophages Chemical composition of phages Interaction of phages with cells Virulent phage replication and lysis	
9		**Plant viruses.** Phytopathogenic viruses Taxonomy of phytopathogenic viruses. Main properties of phytopathogenic viruses	
10		**Viruses of animals.** Viruses of invertebrates Viral diseases of insects Insects as carriers of viruses Viruses of vertebrates and humans	
11		**Pathogenesis of viral infections.** Infection unit Classification of viral infections at the cellular level Classification of viral infections at the organismal level	

		Ways of virus entry into the body Sluggish viral infections	
12		**Oncogenic viruses and treatment of viral infections.** Characteristics of oncogenic viruses Treatment and prevention of viral infections Antiviral chemotherapeutic agents Prevention of viral infections.	
13		**Diagnosis and prevention of DNA-containing viral infections.** Herpesviruses Adenoviruses Papoviruses Poxviruses Hepadenoviruses	
14		**Diagnosis and prevention of RNA-containing viral infections.** Characteristics of the main families Human immunodeficiency virus.	
15		**Diagnosis and prevention of RNA-containing viral infections** Different structural forms of viroids Prion diseases.	

Recommended
Sources
TEXTBOOK(S)

"Principles of Virology" (3rd Edition) by S. Jane Flint, Vincent R. Racaniello, Glenn F. Rall, and Rafael Sanjuán

A comprehensive textbook that covers the molecular biology of viruses, their replication cycles, pathogenesis, and interactions with the host immune system.

"Fields Virology" (7th Edition) edited by David M. Knipe and Peter M. Howley

One of the most authoritative references in the field, covering all aspects of virology, from basic concepts to cutting-edge research on emerging viral diseases.

"Medical Virology" by David O. White and Frank J. Fenner

This text focuses more on the clinical aspects of virology, providing insights into viral diseases that impact humans.

"Virology: Molecular Biology and Pathogenesis" by Edward K. Wagner

This book gives a detailed account of the molecular mechanisms behind viral infections and their consequences.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Parasitology**
Course Unit Code	**ATMF-BO9**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	PhD Mahmud Humbatov

Name of Lecturer (s)	PhD Mahmud Humbatov
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azərbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

"Parasitology" is the science of parasites. The word parasite comes from the Greek word "parasitos" meaning living at the expense of another. Parasitology studies the mutual relationships between the parasite and its host and how they change depending on external environmental factors.

Objectives of the Course:

The study of disease vectors, especially insects and ticks, is of particular importance in determining the routes and methods of parasite transmission to the host. This helps determine the treatment of infectious diseases.

Learning Outcomes: The main task of parasitology is to study the structure of the parasite, its life cycle, its adaptation to feeding on the host, its geographical distribution, its origin, and the effect of the parasite on the host.

At the end of the course the student will be able to		Assessment
1	Operations of the oil and gas industry across the value chain	
2	Relationships and interactions between industry players	
3	Importance of oil and gas in the economy	
4	Likely future scenarios for the industry	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a	

	database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		The subject and tasks of parasitology. Forms of biotic relationships in nature. Theoretical foundations of parasitology.	
2		Parasitism and other forms of coexistence. Parasitism and classification of parasites. Morphofunctional adaptations to parasitic lifestyle.	
3		Parasitic Protozoa: Parasites belonging to the Sarcodinae, Flagellates, Ciliophora, and Sporozoa.	
4		Leishmania. Morphobiological characteristics, distribution.	
5		Life cycle, spread, transmission routes, prevention of malaria pathogens (Plasmodium vivax, P. Falciparum, P. Malariae, P. Ovale)	
6		General characteristics of the types and classes of flatworms, Helminths	
7		Flukes (Trematoda). Structure. Reproduction. Distribution. Characteristics of the life cycle of flukes. Interaction of flukes with mollusks. Adaptation of flukes to vertebrates.	
8		Pollutants whose developmental cycle is related to the aquatic environment.	
9		Protozoa living in the lungs. Distribution characteristics of protozoa belonging to the genus Parago minus. Life cycle of the lung protozoa (P. Westermani). Morphobiological characteristics. Protozoa whose development cycle is not related to the aquatic environment.	
10		General characteristics of the class of tapeworms (Cestoidea).	
11		Biological characteristics of tapeworms of medical importance. Diseases caused by tapeworms - cestodes. Tapeworms that infect only humans. Tapeworms with natural foci.	
12		A variety of tapeworms whose life cycle is not dependent on the aquatic environment.	
13		Characteristics of the phylum Nemathelminthes. Class Nematoda.	

		Characteristics.	
14		Geohelminths (Nematodes) that develop by migration.	
15		Arachnoentomology. Arthropods – Characteristics of medically important orders of the phylum Arthropoda. Transmissible diseases.	

Recommended Sources
TEXTBOOK(S)

1. **"Medical Parasitology: A Textbook of Diseases of Man and Domestic Animals"** by S. S. Sharma
2. **"Parasites and Parasitic Infections"** by S. B. K. Prabhu

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Membranology**
Course Unit Code	**ATMF-B10**
Type of Course Unit	Selective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Membrane science is the study of biological and artificial membranes, their structure, function, and applications. This course explores the fundamental principles of membrane biology, including membrane composition, dynamics, transport mechanisms, signal transduction, and membrane-associated diseases. In addition, the course covers industrial and biomedical applications of membrane technology, such as drug delivery systems, biosensors, and water purification.

Objectives of the Course: The main goal of the discipline of membranology is to study the structure, function, and dynamics of cell membranes. This discipline investigates the composition of biological membranes, their role in the vital activity of cells and organisms, membrane transport systems, intracellular signal transduction, and membrane-related diseases.

137. Operations of the oil and gas industry across the value chain
138. Relationships and interactions between industry players
139. Importance of oil and gas in the economy
140. Likely future scenarios for the industry

Learning Outcomes

Understanding Membrane Structure

Identify the components of biological membranes: Students should be able to identify the key components of biological membranes, including phospholipids, proteins, carbohydrates, and cholesterol.

Understand the fluid mosaic model: Students should comprehend the structure of membranes as dynamic, fluid mosaics of lipid bilayers with embedded proteins.

Describe membrane asymmetry: Understand the structural asymmetry of biological membranes in terms of lipid and protein distribution across the two leaflets.

Function and Role of Membranes

Explain membrane functions: Students should be able to describe the diverse roles of biological membranes, including acting as barriers, mediators of cell signaling, sites for enzymatic activity, and facilitators of transport.

Understand the concept of membrane permeability: Explain how biological membranes selectively allow molecules to pass via passive or active transport.

Explore membrane trafficking: Understand vesicular trafficking, endocytosis, and exocytosis in cells.

At the end of the course the student will be able to		Assessment
1	Understand the structure and physicochemical properties of biological membranes.	
2	Be able to explain membrane transport mechanisms, including passive and active transport.	
3	Will investigate membrane-associated signal transduction pathways and their physiological significance.	
4	Will analyze membrane dynamics, trafficking, and their roles in cellular function.	
5	Will learn about artificial membranes and their applications in biotechnology and industry.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani language in the specialty	
2	Communication skills in at least one foreign language in the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to predict the prospective development of our national state	
4	Ability to identify threats and challenges facing our nation-state;	
5	Ability to use information technology in the workplace;	
6	Ways of collecting and storing data, ability to create a database	
7	Ability to work in a team and achieve a common approach to problem solving;	
8	Ability to adapt to new circumstances, take initiative, and have the will to succeed	
9	Ability to identify and select additional information resources to solve problems;	
10	Skills to analyze, summarize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction to Membranology	

2		Structure of Biological Membranes	
3		Membrane Lipids	
4		Membrane Proteins	
5		Membrane dynamics	
6		Membrane transport mechanisms	
7		Membrane potential and bioelectrics	
8		Membrane and signal transduction	
9		Membrane transport during illness	
10		Experimental methods in membrane biology	
11		Experimental methods in membrane biology	
12		Conclusions and future directions of membraneology	
13		Membrane Transport in Plants and Microorganisms	
14		Reconstruction and adaptation of membranes	
15		Membrane interactions with drugs and pharmaceuticals	

Recommended
Sources
TEXTBOOK(S)

"Molecular Biology of the Cell" (Alberts et al.)
A comprehensive resource for cell biology, with detailed chapters on membrane structure, function, and trafficking. It provides an in-depth look at how biological membranes contribute to cellular processes.
Publisher: Garland Science

"Biochemistry" (Berg, Tymoczko, and Gatto)
Covers membrane structure and function, membrane proteins, and the biochemical processes that occur at membranes.
Publisher: W. H. Freeman

"Membrane Structure and Function" (David P. Tieleman)
Focuses on the structure and function of biological membranes, offering insights into lipid bilayer formation, membrane proteins, and membrane dynamics.
Publisher: Springer

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations			
ECTS allocated based on Student Workload			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Nanobiotechnology**
Course Unit Code	**ATMF-B10**
Type of Course Unit	Selective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	
Name of Lecturer (s)	
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azerbaijan
Prerequisites	-

Recommended Optional Program Components	-

Course description:

This course introduces the basic principles and characteristics of nanotechnology and biotechnology. This course focuses on the development and application of convergence technology that can be achieved by combining these two technologies.

Objectives of the Course:

The aim of this course is to provide an understanding of the fundamentals of nanotechnology in biological and biomedical research. It will also help students understand how nanomaterials can be used for various analytical and medical research.

- Understand the principles of nanotechnology and biotechnology
- Understand the characteristics of convergence technology and their applications.

141. Operations of the oil and gas industry across the value chain
142. Relationships and interactions between industry players
143. Importance of oil and gas in the economy
144. Likely future scenarios for the industry

Learning Outcomes

Understanding the Principles of Nanotechnology and Biotechnology

Demonstrate knowledge of basic nanotechnology principles, including nanomaterials, nanosystems, and their applications.

Understand the fundamental biological concepts related to molecular biology, biochemistry, and cellular processes.

Recognize the interface between nanotechnology and biotechnology in applications like drug delivery, diagnostics, and bio-sensing.

Nanomaterials and Their Properties

Identify different types of nanomaterials (e.g., nanoparticles, nanowires, nanocomposites) and their unique properties.

Analyze the properties of nanomaterials that make them suitable for biological applications (e.g., biocompatibility, surface functionalization, and toxicity).

At the end of the course the student will be able to		Assessment
1	Understand the key features of biology and nanotechnology that are merging to create the new field of nanotechnology.	
2	To recognize the structural and functional principles of bionanotechnology.	
3	Using nanomaterials for analysis and sensing methods.	
4	Understand and explain the biomedical applications of nanotechnology.	
5		

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani language in the specialty	
2	Communication skills in at least one foreign language in the field of specialization;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural and ideological foundations of Azerbaijani statehood, as well as its	

	place and role in the modern world; the ability to predict the prospective development of our national state	
4	Ability to identify threats and challenges facing our nation-state;	
5	Ability to use information technology in the workplace;	
6	Ways of collecting and storing data, ability to create a database	
7	Ability to work in a team and achieve a common approach to problem solving;	
8	Ability to adapt to new circumstances, take initiative, and have the will to succeed	
9	Ability to identify and select additional information resources to solve problems;	
10	Skills to analyze, summarize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction and Fundamentals of Nanobiotechnology	
2		Nanobiotechnology and its development	
3		Field integration of nanomaterials, nanoelectronics, nanobiotechnology	
4		Biological applications of nanomaterials	
5		Nanomaterial Technology	
6		Drug transportation and controlled release	
7		Nanosystems (liposomes, nanoparticles, dendrimers)	
8		Biological drug delivery systems	
9		Nanobiotechnology and genetic engineering	
10		Biosensors and bioreactor systems	
11		Entry of nanomaterials into cells and activity in the tissue environment	
12		Nanobiotechnology and Immunology	
13		Use of nanomaterials in diagnostics	
14		Applications of Nanobiotechnology in Agriculture and the Environment	
15		Nanobiotechnology and Ethical Issues, Legislation	

Recommended Sources

TEXTBOOK(S)

"Nanobiotechnology: Concepts, Applications, and Perspectives"

Authors: **C. M. Niemeyer** and **C. A. Mirkin**

Overview: This book provides a comprehensive introduction to the principles and applications of nanobiotechnology, with a focus on the interaction between nanomaterials and biological systems.

"Nanobiotechnology: A Practical Approach"

Author: **Bikramjit Basu**

Overview: Focuses on the practical applications and emerging technologies in nanobiotechnology, offering case studies and techniques used in the field.

"Introduction to Nanobiotechnology"

Author: **Avinash V. S. and K. S. Rajasekhar**

Overview: Provides an introduction to the application of nanotechnology in biological systems, with coverage of the methods, techniques, and tools used in the field.

"Nanotechnology in Medicine"

Author: **Tuan Vo-Dinh**

Overview: A detailed exploration of the potential and current uses of nanotechnology in the medical field, from drug delivery systems to diagnostic applications.

Assessment		
Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Genetic engineering**
Course Unit Code	**ATMF-BO10**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Phd Ayaz Mammadov
Name of Lecturer (s)	Phd Ayaz Mammadov
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azərbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Genetic engineering is one of the modern biological and medically important sciences with high prospects and is in development. The main essence of genetic engineering is the construction of an organism with hereditary characteristics. Thus, thanks to genetic engineering, gene therapy, and the production of important bacterial strains are carried out in the field of microbiology in modern times.

Objectives of the Course: The purpose of teaching the subject is to explain to students in detail the modern methods of genetic engineering and its relationship to other sciences. It is also to provide them with a foundation in genetic engineering if they are to conduct future scientific research in this field.

Learning Outcomes

145. Operations of the oil and gas industry across the value chain
146. Relationships and interactions between industry players
147. Importance of oil and gas in the economy

Likely future scenarios for the industry

At the end of the course the student will be able to		Assessment
1	The stages of the formation and development of genetic engineering, its material basis, subject, tasks, research methods, goals, enzymes used in the production of recombinant molecules, selection of vectors and cloning methods.	
2	Methods of transferring genes of higher animals and plants into microbial cells.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		
Course Contents		

Week	Chapter	Topics	Exam
1		Topic 1: History of the development of genetic engineering. Objectives and tasks. Fields of research in genetic engineering.	
2		Topic 2: Gene expression. Genes and genomes.	
3		Topic 3: DNA and RNA vectors. Hybrid plasmid-phage vectors.	
4		Topic 4: Transformation and transfection.	
5		Topic 5: Restriction enzymes – DNA cleavage. DNA-modifying enzymes.	
6		Topic 6: Isolation of DNA and RNA. Gel electrophoresis.	
7		Topic 7: DNA sequencing. Principles of DNA sequencing.	
8		Topic 8: Polymerase chain reaction (PCR).	
9		Topic 9: Cloning strategies. Cloning from mRNA.	

10		Topic 10: Cloning of genomic and complementary DNA.	
11		Topic 11: Transgenic plants and animals.	
12		Topic 12: Analysis and functions of gene structures.	
13		Topic 13: Genome sequencing. Human Genome Project.	
14		Topic 14: Transcriptomes.	
15		Topic 15: Recombinant DNA (rDNA) technology – gene therapy.	

Recommended
Sources
TEXTBOOK(S)

- **Primrose, SB, & Twyman, RM (2013)** – *Gen Manipulyasiya və Genomika Prinsipləri* . Wiley-Blackwell.
- **Brown, TA (2016)** – *Gen Klonlaması və DNT Analizi: Giriş* . Wiley-Blackwell.
- **Lewin, B. (2017)** – *Gen XII* . Jones & Bartlett Learning.
- **Watson, JD, et al. (2014)** – *Genin Molekulyar Biologiyası* . Pearson.
- **Old, RW, & Primrose, SB (2004)** – *Gen Manipulyasiyasının Prinsipləri* . Blackwell Elmi.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			

Total Workload	**150**
Total Workload/30(h)	**150\30**
ECTS Credit of the Course	**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Gerontology**
Course Unit Code	**ATMF-B011**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	PhD Natavan Karamova
Name of Lecturer (s)	PhD Natavan Karamova
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azərbaijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: The main goal of the science of gerontology in the modern era is to explain the primary mechanisms of aging, to determine the mutual relationships between the vital activity of the organism and aging, to clarify the characteristics of the adaptation of the age characteristics of the organism to the environment, to study the main characteristics of the phenomenon of longevity. The basis of the phenomenon of longevity is the changes that occur against the background of the normal continuation of human life, the accumulation of adaptive mechanisms and genetic-hereditary traits that are clearly manifested during physiological aging, and the study of the consequences of the influence of socio-economic and ecological-environmental factors on the organism. "Gerontology" is both a theoretical and practical discipline.	
Objectives of the Course: The course "Gerontology" reflects a theoretical and methodological approach to a broad and comprehensive study of normal and pathological processes occurring in the human body, which is the object of scientific research. The main goal	

of the course is to study the highest being, the human being, at the level of the organism and to analyze the indicators that are important for health. By studying this course, students will understand the human body as a single system. Thus, this specialty course aims to provide students with deeper knowledge about the functional organization of the body, enabling them to understand medicine, genetics, applied biology and diagnostics, as well as other related fields of science, in the future, and to increase their intellectual level. Extending human life and protecting human health are always relevant.

Learning Outcomes

Operations of the oil and gas industry across the value chain
Relationships and interactions between industry players
Importance of oil and gas in the economy
Likely future scenarios for the industry

At the end of the course the student will be able to		Assessment
1	- Physiological and pathological aging	
2	- About gerontology: Geriatrics.	
3	- Classification and characteristics of gerontology.	
4	- Longevity and biological aging.	
5		

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	

10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		About gerontology: main goals and tasks. Geriatrics. Physiological and pathological aging	
2		Classification and features of gerontology.	
3		Longevity and biological aging. Longevity index.	
4		Factors affecting aging and longevity.	
5		Cognitive processes in gerontology: the basics of memory, attention, perception and understanding.	
6		Norms and pathologies of the respiratory system in gerontology.	
7		Physiological bases and pathologies of the cardiovascular system in gerontology.	
8		Norms and pathologies of the digestive system depending on physiological age.	
9		The main physiological mechanisms of the urinary system in gerontology.	
10		Endocrine changes in the elderly.	
11		Age-related characteristics of the connective tissue and bone system	
12		Physiological and pathological characteristics of analyzers in the elderly.	
13		Features of hematopoiesis in the elderly.	
14		Psychological indicators of the elderly: features of anxiety and depression.	
15		Basic examination and diagnostic methods in gerontology. Hygienic requirements and physiological age-appropriate norms.	

Recommended Sources

TEXTBOOK(S)

1. **"The Biology of Aging: Observations and Principles"** by Robert Arking
2. **"Principles of Geriatric Medicine and Gerontology"** edited by John E. Morley, David W. Guo, and Steven R. Tesfaye
3. **"Handbook of the Biology of Aging"** edited by Matt Kaeberlein and David L. Pincus

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	

Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Human genetics**
Course Unit Code	**ATMF-B11**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	PhD Saida Hasanova
Name of Lecturer (s)	PhD Saida Hasanova
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azərbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

To classify genetic diseases in humans, provide students with information about the genetic mechanisms of these diseases, make diagnoses using effective methods in the diagnosis of diseases, and instill prenatal and postnatal diagnostic methods.

Objectives of the Course:

The aim of the subject is to understand the classification of genetic diseases and their mechanisms of occurrence, diseases transmitted in autosomal recessive and dominant ways, chromosomal diseases, causes of occurrence, and the role of epigenetic factors in the occurrence of diseases.

Learning Outcomes :

1. Operations of the oil and gas industry across the value chain
2. Relationships and interactions between industry players
3. Importance of oil and gas in the economy
4. Likely future scenarios for the industry

At the end of the course the student will be able to		Assessment
1	Modern classification of hereditary diseases	
2	Recessive and dominant inherited diseases	
3	Multifactorial diseases	
4	Diagnostic methods	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL

1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introduction to human genetics, basic concepts	
2		Classification of human genetic diseases	
3		Single gene diseases	
4		Hemoglobinopathies	
5		Alpha-thalassemia, Sickle cell anemia	
6		Autosomal dominant diseases	
7		Chromosomal diseases	
8		Trisomies	
9		General information about cancer development	
10		Multifactorial diseases	
11		Cancer stem cells	
12		Epigenetics, Epigenetic mechanisms	
13		Epigenetic modifications	

14		Histone modifications	
15		Non-coding RNAs	

Recommended Sources

TEXTBOOK(S)

1. **"Human Genetics: Concepts and Applications"** by Ricki Lewis
2. **"Principles of Medical Genetics"** by Thomas D. Gelehrter and Francis S. Collins
3. **"Human Molecular Genetics"** by Tom Strachan and Andrew Read
4. **"Medical Genetics"** by Jorde, Carey, and Bamshad

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Cell biology**
Course Unit Code	**ATMF-B12**
Type of Course Unit	Seçmə
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	2
Semester when the course unit is delivered	2
Course Coordinator	PhD Lala Qurbanova
Name of Lecturer (s)	PhD Lala Qurbanova
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azərbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:
Welcome to the Cell Biology course, one of the elective subjects of our education. During the teaching of the subject, modern information is provided about cell theory, types of cell structure, and structural and functional systems of eukaryotic cells. Also, the role played by various cell structures in the processes of cell life: metabolism and energy conversion, information transfer flow, cell signals, proliferation, differentiation, and apoptosis is explained. Special attention is paid to considering the molecular mechanisms underlying these identified processes. Currently, Cell Biology is a rapidly developing science. The teaching of the subject is closely related to the disciplines of cytology, biochemistry, molecular biology, and genetics. Therefore, throughout the course, we will try to study issues that meet the requirements of the modern era.

Objectives of the Course: During the study of the subject: to develop in students a holistic understanding of the cell as a biological system, based on the achievements of modern biological science, and to prepare them for productive comprehension and study of biological, medical and clinical subjects. The sequence of presentation of materials based on a systematic approach that allows considering the basic structure for educational presentation and the functional organization of the cell in their close unity and interaction serves to achieve this goal.

148. Operations of the oil and gas industry across the value chain
149. Relationships and interactions between industry players
150. Importance of oil and gas in the economy
151. Likely future scenarios for the industry

Learning Outcomes:
- history of cytology and achievements of modern cell biology;
- light, electron microscopy, quantitative cytochemical, immunocytochemical and other research

methods for studying the structure and function of cells and tissues; - basic provisions of cell theory; - organization of the structural and functional properties of the cell nucleus, cytoplasm, hyaloplasm, cytosol; - structure and function of cell organelles as the most important compartments of the cell; - mechanisms of cell division and regulation of the cell cycle; - molecular genetic basis of cytodifferentiation in normal and pathological conditions; - forms of cell death (necrosis and apoptosis); scientific terminology in the field of cell biology.		
At the end of the course the student will be able to		Assessment
1	As a result of mastering the subject, students should know: - the physicochemical foundations of methodological approaches to the analysis of the structure and function of cells in vivo and in vitro;	
2	- the characteristics of the organization and activity of pro- and eukaryotic cells, the totipotency and pluripotency of cells;	
3	- the structure and function of organelles, the characteristics of the interaction between vesicular transport systems, the musculoskeletal system, and the formation of bioenergy;	
4	- molecular genetic basis of cytodifferentiation;	
5	- mechanisms of the formation of pathologically altered cells, including tumor cells;	
Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz		
Course's Contribution to Program		
		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-	

	solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		1. Cell Theory	
2		2. Types of Cell Organization	
3		3. General Features of the Structural and Functional Organization of the Cell. Structure and Properties of Biological Membranes	
4		4. The Cell Surface Apparatus. Transport of Substances Through the Plasma Membrane	
5		5. Cytoplasm. Organelles and Cell Derivatives	
6		6. Systems for the Preservation, Replication, and Expression of Genetic Information	
7		7. General Characteristics of Metabolism and Energy Conversion in the Cell. Different Pathways of Cellular Metabolism	
8		8. Energy Metabolism in the Cell	
9		9. General Features of Information Flow in the Cell. DNA Replication	
10		10. Gene Expression. Molecular Organization of Genes in Prokaryotes and Eukaryotes	
11		11. Basics of Gene Expression Regulation	
12		12. General Features of Cell Signaling. Mechanisms of Cellular Signaling	
13		13. Life Cycle of the Eukaryotic Cell	
14		14. Regulation of the Cell Cycle	
15		15. Cell Death	

Recommended Sources

TEXTBOOK(S)

4. *An Introduction to Systems Biology: Design Principles of Biological Circuits* CRC Press, 2006.
5. *Foundations of Systems Biology* MIT Press, 2001.

3. Cell and Molecular Biology: Concepts and Experiments

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	

Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "Natural sciences".

Course Unit Title	**Systems biology**
Course Unit Code	**ATMF-BO12**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	2

Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Reyhan Abdullayeva
Name of Lecturer (s)	Reyhan Abdullayeva
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azərbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Systems biology is an actively developing interdisciplinary field of science that analyzes the multicomponent nature of complex biological systems, taking into account the existence of direct and feedback relationships, as well as the heterogeneity of experimental data.

Objectives of the Course:

- integration and storage of experimental data and the results of their analysis;
- development of methods, approaches and technologies for the analysis of biological data;
- analysis of large-scale biological data - complete genomes, transcriptomes, proteomes, etc.;
- mathematical modeling of the dynamics of biological systems

Learning Outcomes

152. Operations of the oil and gas industry across the value chain
153. Relationships and interactions between industry players
154. Importance of oil and gas in the economy
4. Likely future scenarios for the industry

At the end of the course the student will be able to		Assessment
1	-Basic methods of systems biology, in particular, basic methods of gene construction.	
2	- Analyze biological data using systems biology methods and approaches	
3	-Analyzing the structure of the gene network graph	
4	-Must know the basic methods of gene network modeling	
5	-Applying systems biology methods to solve specific research problems	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its	

	place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Topic No 1: Introduction	
2		Topic No 2: Structure, Functional Organization, and Integration of Gene Networks	
3		Topic No 3: Functional Networks: Structure, Dynamics, and Evolution	
4		Topic No 4: Gene Networks in Individual Development	
5		Topic No 5: Gene Networks in Individual Development	
6		Topic No 6: Signal Transduction Pathways	
7		Topic No 7: Metabolism and Gene Networks	
8		Topic No 8: Genetic Algorithms	
9		Topic No 9: Mathematical Modeling Methods in Biological Systems	
10		Topic No 10: Mathematical Assessment of Biological Diversity	
11		Topic No 11: Convective-Diffusive Transport and Substance Transformation in Water Bodies	
12		Topic No 12: Mathematical Modeling of Waste Disposal in the Atmosphere	
13		Topic No 13: Simulation Modeling	
14		Topic No 14: Spread of Oil Products on Surfaces and in Aquatic Environments	
15		Topic No 15: Biochemistry of Microorganisms	

Recommended
Sources
TEXTBOOK(S)

6. *An Introduction to Systems Biology: Design Principles of Biological Circuits* CRC Press, 2006.
7. *Foundations of Systems Biology* MIT Press, 2001.
8. Cell and Molecular Biology: Concepts and Experiments

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**

MODULE HANDBOOK

Bachelor program in Biology, Department of "English Philology".

Course Unit Title	**Academic writing and reading**
Course Unit Code	**ATMF-BO1**
Type of Course Unit	
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	1
Practice (hour/week)	1
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Musayeva Shabnam
Name of Lecturer (s)	Musayeva Shabnam
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The suggested program on "Academic writing and reading" is designed for the students of Political Sciences Department and of Philology and Translation departments at Western University. The course is intended for one semester of education.The course starts with simple free writings and reading easy texts in order to find out the student's difficulties in English language, teaching them the techniques of free writing, using five steps of writing process and using easy ways of reading and understanding the texts. A guided self analyses of students' work individually will reveal their major mistakes in writing and reading. It generally results in greater motivation on the part of a student.

The main aim in teaching English writing is firstly; to build up a new set of phrases and sentences and language skills.Secondly is to improve new writing skills and to build up correct English reading skills

Objectives of the Course:

This course aims to provide stimulating material for language development for students of Western University Languages Department. While working through the material of this course the students will develop and practice several language skills such as free writing, taking notes, editing, accurately communicating their meaning, reading general information, identifying topic sentences, etc. Good writing is more than just using correct grammar rules. It also means free writing, planning, revising, mapping and checking.

Learning Outcomes

Understand the principles of academic writing

Students will be able to identify the key features and conventions of academic writing in various disciplines.

Develop effective reading strategies

Students will demonstrate the ability to critically read and analyze academic texts for main ideas, arguments, and supporting evidence.

Produce clear, coherent, and well-structured academic texts

Students will write essays, reports, and research papers that follow academic standards for organization, clarity, and style.

At the end of the course the student will be able to		Assessment
1	Develops the ability to approach the history of ethical thought rationally; provides a comprehensive understanding of modern approaches to studying ethical knowledge, the essence of morality, and classifies its main functions.	
2	Emphasizes the importance of maintaining objectivity in the study of the history of ethical thought.	
3	Applies the acquired theoretical knowledge in professional and everyday activities.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1		Introducing people.	
2		Introducing himself	
3		Writing process.	
4		Descriptive writing	
5		Explaining a process.	
6		Sentence combining	
7		Narrative writing.	
8		Journalistic questions	

Recommended Sources
TEXTBOOK(S)

1. **They Say / I Say: The Moves That Matter in Academic Writing"** by Gerald Graff and Cathy Birkenstein
2. **"Academic Writing for Graduate Students: Essential Tasks and Skills"** by John M. Swales and Christine B. Feak
3. **"The Elements of Academic Style: Writing for the Humanities"** by Eric Hayot
4. **"Writing Academic English"** by Alice Oshima and Ann Hogue

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

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

Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Magistr program in Biology, Department of "Natural sciences".

Course Unit Title	Genomics and epigenetics
Course Unit Code	**ATMF-BO11**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	5
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	1, 2
Course Coordinator	PhD Hasanova Saida
Name of Lecturer (s)	PhD Hasanova Saida
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azərbijan
Prerequisites	-
Recommended Optional Program Components	-
Course description: This course will introduce the theory and practice of genomics. Topics include genome overview, sequencing and mapping, comparative genomics, transcriptomes, population genetics and genomics, basic bioinformatics, population-level variation (SNPs, MNPs, indels), ethics, evolutionary genomics, and functional genomics. This course is designed to introduce graduate students with a background in biology, genetics, and molecular and cell biology to the field of genomics.	
Objectives of the Course: The aim of this course is to introduce students to the tools and principles of modern genomics. At the end of the course, students will have a working knowledge of current genomics technologies and approaches, as well as available database types and	

computational tools.

Learning Outcomes

To introduce students to genomic methods.

• Encourage students to think at the genomic scale.

• Get students excited about the hottest areas in biology.

• Demystify modern genomics methods and concepts.

• Introduce necessary terminology.

• Explore basic biology in the context of theoretical and applied genomic research.

• Understand the broad applications of genomics.

• Become proficient with basic web-based tools for "doing" genomics.

• Appreciate the benefits of using mathematics and computer science to understand biology at the genome scale.

At the end of the course the student will be able to		Assessment
1	- Formation of an understanding of genomics;	
2	- Formation of students' ideas about the goals and objectives of their training;	
3	- Formation of knowledge about research conducted in the field of modern genomics;	
4	- Formation of knowledge about the structure of DNA and RNA, which are the material basis of heredity, genes and the mechanism of their functioning;	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	

8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
1.		Topic 1. History and Objectives of Genomics. Genome and Genomics	
2.		Topic 2. The Human Genome Project	
3.		Topic 3. Structural Genomics	
4.		Topic 4. Functional Genomics	
5.		Topic 5. Comparative Genomics	
6.		Topic 6. Evolutionary Genomics	
7.		Topic 7. Structural and Functional Organization of Genetic Information in Eukaryotes	
8.		Topic 8. Mitochondrial and Chloroplast Genomes	
9.		Topic 9. Genomes of Prokaryotes and Viruses	
10		Topic 10. Epigenomics	
11		Topic 11. Metagenomics	
12		Topic 12. Transcriptomics and Proteomics	
13		Topic 13. Regulation of Gene Activity	
14		Topic 14. Gene Mapping in the Genome – NCBI Tutorial	
15		Topic 15. Analysis of Results Obtained by NGS (Next Generation Sequencing) and Detection of SNPs	

Recommended Sources

TEXTBOOK(S)

1. Sandy B. Primrose, Richard Twyman. Genomics. Applications in Human Biology. 2008
2. William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino, Darrell J.Killian. Concepts of Genetics (12th edition). Pearson Education Inc., 2019, 867 pp.
3. Mike Starkey, Ramnath Elaswarapu.Genomics.Essential Methods.2010

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	

Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**150**
Total Workload/30(h)			**150\30**
ECTS Credit of the Course			**5**

MODULE HANDBOOK

Bachelor program in Biology„Department of "Foreign Languages".

Course Unit Title	**Latin language**
Course Unit Code	**ATMF-B01**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	2

Course Coordinator	Mehdiyeva Lyudmila Mammad
Name of Lecturer (s)	Mehdiyeva Lyudmila Mammad
Name of Assistant (s)	-
Mode of Delivery	Full Time
Language of Instruction	Azeirbaijan
Prerequisites	-
Recommended Optional Program Components	-

Course description:

Although Latin is not a spoken language, it has preserved its independence in certain fields up to the present day. For example, it is impossible to imagine legal and medical terminology without Latin. Many phonetic, grammatical, and lexical features of modern Romance languages can be clearly understood based on the study of Latin.

Objectives of the Course:

The goal is to teach students the phonetics and grammar of the Latin language, as well as the essential lexical minimum of terminology related to each section.

Learning Outcomes

Demonstrate understanding of Latin phonetics and pronunciation rules.
Apply basic Latin grammar structures in reading and translation exercises.
Recognize and use essential Latin vocabulary and terminology across different contexts.
Translate simple Latin texts into English (or target language) with accuracy.
Analyze sentence construction and syntax in Latin texts.

At the end of the course the student will be able to		Assessment
1	The teaching of the Latin language enables the development of students' intellectual potential and the formation of successful, highly intelligent, creative individuals in the modern system of relations. Additionally, the main goal is to assist by providing free access to global information resources during the learning process	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world the ability to forecast the future development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Knowledge of methods for collecting and storing data; ability to create a database;	
9	Ability to identify and select additional information resources for problem-solving;	

10	Ability to analyze, generalize, and apply relevant information for professional purposes;		
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
Course Contents			
Week	Chapter	Topics	Exam
1		A brief overview of the history of the Latin language. The Latin alphabet and classification of sounds. Diphthongs. Pronunciation of consonants and letter combinations. Pronunciation of digraphs. Concept of stress.	
2		Information about syllables. Long and short suffixes.	
3		Morphology. Noun (Substantium). Cases of nouns. Declension of first declension nouns.	
4		Declension of second and third declension nouns.	
5		Declension of fourth and fifth declension nouns.	
6		Declension of fourth and fifth declension nouns.isimlərin hallanması.	
7		Pronouns (Pronomina). Personal pronouns (Pronomina personalia).	
8		Possessive pronouns (Pronomina possessiva). Demonstrative pronouns (Pronomina demonstrativa).	
9		Interrogative and relative pronouns (Pronomina interrogativa et relativa).	
10		Indefinite pronouns (Pronomina indefinita).	
11		Verb (Verbum). Indicative mood (Modus indicativus). Imperative mood (Modus imperativus). Subjunctive mood (Modus conjunctivus).	
12		Lexical minimum for verbs. Third and fourth conjugations.	
13		Simple sentence. Word order in a sentence.	
14		Prepositions (Praepositiones). Conjunctions (Conjunctiones).	
15		Aphorisms in Latin.	

Recommended Sources
TEXTBOOK(S)

1. **Wheelock's Latin** by Frederic M. Wheelock and Richard A. LaFleur
2. **Latin for Beginners** by Benjamin L. D'Ooge
3. **Cambridge Latin Course** by Cambridge School Classics Project
4. **Lingua Latina per Se Illustrata** by Hans Ørberg
5. **Latin Grammar** by Dirk Panhuis

Assessment		
Attendance	10%	At least 75% class attendance is compulsory

Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**180**
Total Workload/30(h)			**180\30**
ECTS Credit of the Course			**6**

MODULE HANDBOOK

Magistr program in Biology, Department of "Natural sciences".

Course Unit Title	Proteomics
Course Unit Code	**ATMF-BO12**
Type of Course Unit	Elective
Level of Course Unit	
National Credits	-
Number of ECTS Credits Allocated	4
Theoretical (hour/week)	2
Practice (hour/week)	2
Laboratory (hour/week)	-
Year of Study	1
Semester when the course unit is delivered	1, 2

Course Coordinator	PhD Hasanova Saida
Name of Lecturer (s)	PhD Hasanova Saida
Name of Assistant (s)	-
Mode of Delivery	Full time
Language of Instruction	Azerbijan
Prerequisites	-
Recommended Optional Program Components	-

Course description: Genomics, a field of science that studies genomes, emerged in the 1970s and 1980s, but gained momentum with the launch of genome projects in the 1990s. Genomics allows us to determine the genome sequence of various organisms, the position and function of genes, changes in the gene expression profiles of cells under different conditions, the history of organisms, as well as to solve problems in the genome using biotechnological and molecular biological methods, and thus improve the health of various organisms, and most importantly, humans (drugs, diagnostics, prognostics, personalized healthcare).

Objectives of the Course: The aim of the course is to provide masters with detailed information about the organization of the genome in pro- and eukaryotes, various areas of genomics, and functional genomics approaches, as well as to instill theoretical and certain practical skills in Next Generation Sequencers and their working principles, advantages, and disadvantages.

Learning Outcomes

Define the field of genomics and explain its significance in modern biological research.
Describe the structure and organization of genomes in prokaryotes, eukaryotes, and viruses.

At the end of the course the student will be able to		Assessment
1	Explain the methods used in genome sequencing, including next-generation sequencing (NGS), and their applications in genomic studies.	
2	Analyze the principles and processes of genome assembly, annotation, and functional genomics.	
3	Understand how genomic data is generated, stored, and analyzed using bioinformatics tools and databases.	
4	Interpret the results of genome-wide studies, including gene expression profiling, comparative genomics, and population genomics	
5	Evaluate the role of genomics in understanding genetic variation, evolutionary processes, and the genetic basis of diseases.	

Assessment Methods: 1. Final Exam, 2. Presentation 3. Midterm 4. Quiz

Course's Contribution to Program

		CL
1	Oral and written communication skills in Azerbaijani relevant to the specialty;	
2	Communication skills in at least one foreign language relevant to the specialty;	
3	Systematic and comprehensive knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its place and role in the modern world; the ability to forecast the future	

	development of our national state;	
4	Ability to identify the threats and challenges facing our national state;	
5	Ability to use information technologies in the workplace;	
6	Knowledge of methods for collecting and storing data; ability to create a database;	
7	Ability to work in a team and achieve a joint approach to problem-solving;	
8	Ability to adapt to new situations, take initiative, and demonstrate the will to succeed;	
9	Ability to identify and select additional information resources for problem-solving;	
10	Ability to analyze, generalize, and apply relevant information for professional purposes;	

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

Course Contents

Week	Chapter	Topics	Exam
16		Genome and genomics. History of genomics. Genome projects	
17		The main features of the human genome. The human genome project	
18		The structure of the eukaryotic genome. Repetitive elements in the genome	
19		Structure of the prokaryotic genome, operon system, repetitive elements in bacteria	
20		Viral genome, Baltimore classification of viruses	
21		Functional genomics, individualized approaches, and gene inactivation methods	
22		Functional genomics, total approach method, transcriptomics, RNA-seq	
23		Evolutionary genomics, acquisition of new genes	
24		Metagenomics, research object, methods	
25		Other areas of genomics: comparative genomics, medical genomics, pharmacogenomics, paleogenomics	
26		Genome reading methods: Sanger method (enzymatic, chain termination)	
27		First generation sequencing methods: automated Sanger, pyrosequencing, SBS	
28		Next Generation Sequencing methods, generation II sequencing:	

		Illumina sequencer, bridge amplification, emulsion PCR method	
29		Non-optical semiconductor sequencing: Ion Proton and Ion PGM sequencers	
30		Generation III and IV sequencing methods: Single molecule real-time sequencing, sequencing with Nanopore technology.	

Recommended Sources
TEXTBOOK(S)

4. Richard Twyman. Principles of Proteomics, Second Edition, Garland Science: 260 p. 2013.
5. Gregory A. Petsko, Petsko, Dagmar Ringe Protein Structure and Function. New Science Press, 2004, 195 pages
6. Josip Lovric. Introducing Proteomics: From Concepts to Sample Separation, Mass Spectrometry and Data Analysis. Willey: 296 p. 2011.

Assessment

Attendance	10%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	0%	
Seminars	30%	
Midterm Exam	0%	
Final Exam	50%	
Total	100%	

Assessment Criteria
Final grades are determined according to the Academic Regulations of WCU

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 Western Caspian University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class			
Presentation			
Self-study			
Tutorials			
Midterm Examination			
Preparation for midterm exam			
Final Examination			
Preparation for final exam			
Total Workload			**120**
Total Workload/30(h)			**120\30**
ECTS Credit of the Course			**4**